BECKHOFF New Automation Technology

Documentation | EN

EL7062

2-channel stepper motor interface with incremental encoder



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1 Foreword

1.1 Notes on the documentation

Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
The qualified personnel is obliged to always use the currently valid documentation.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement.

No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Signal words

The signal words used in the documentation are classified below. In order to prevent injury and damage to persons and property, read and follow the safety and warning notices.

Personal injury warnings

⚠ DANGER
Hazard with high risk of death or serious injury.

⚠ WARNING
Hazard with medium risk of death or serious injury.

⚠ CAUTION
There is a low-risk hazard that could result in medium or minor injury.

Warning of damage to property or environment

NOTICE
The environment, equipment, or data may be damaged.

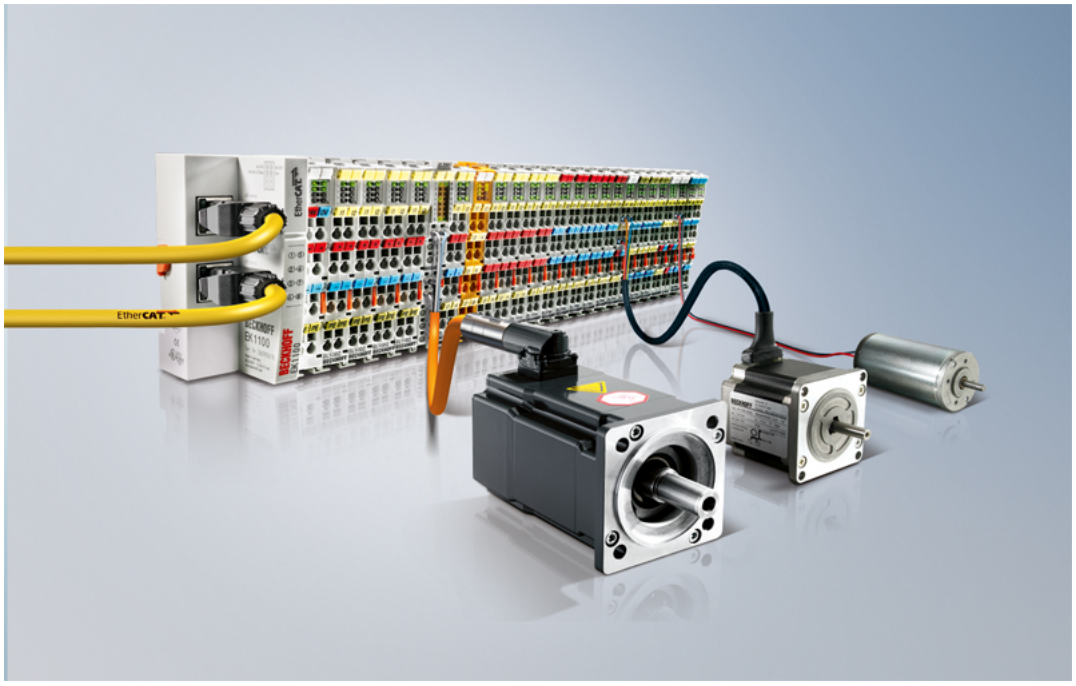
Information on handling the product



This information includes, for example:
recommendations for action, assistance or further information on the product.

2 System overview

Compact drive technology



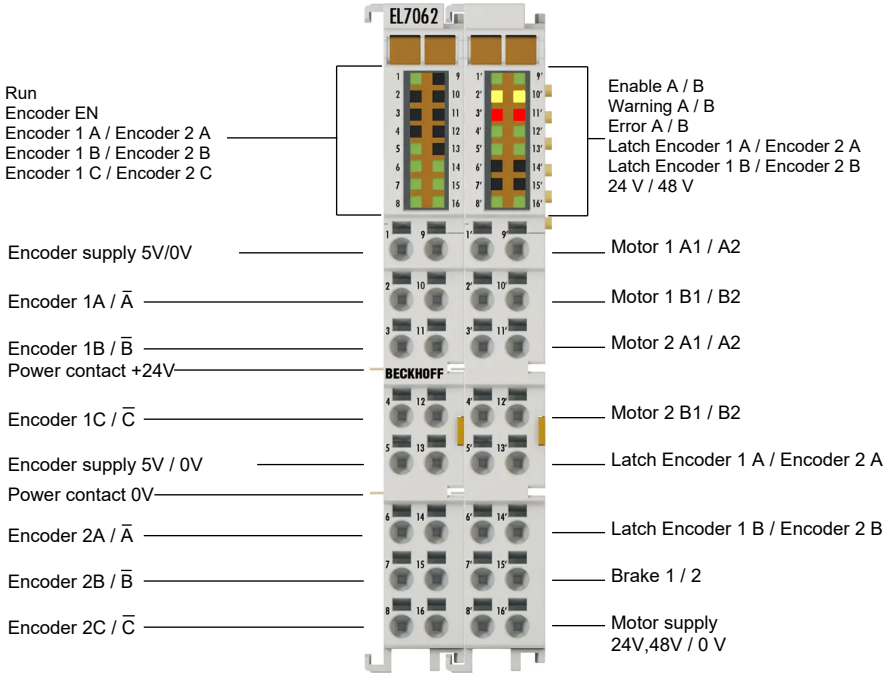
Beckhoff offers a wide range of compact, modular, and scalable drive solutions at I/O level for connecting all common drive technologies such as servo, stepper, BLDC, and DC motors in the low voltage range up to 48 V. The performance spectrum ranges from 50 mA for controlling external power amplifiers up to 16 A for the direct operation of a servomotor. Direct integration into Beckhoff's TwinCAT automation software enables convenient and fast commissioning. With comprehensive and powerful tools such as Motion Designer, Drive Manager 2 and Scope, TwinCAT 3 offers an optimum development environment for fast and efficient implementation of drive technology requirements.

In addition, Beckhoff also offers an extensive selection of accessories, which includes not only pre-assembled cables and gearboxes, but also brake chopper terminals, braking resistors, and an external fan cartridge for increased performance.

3 Product description

3.1 EL7062

3.1.1 Introduction



The EL7062 EtherCAT Terminal is a 2-channel stepper motor output stage. A stepper motor with an operating voltage between 8 V and 48 V can be connected to each channel.

The terminal supplies an overall current of up to 6 A, distributed over both channels. A single channel can be loaded with up to 5 A as long as the overall current does not exceed 6 A.
Up to 10 A overall current and 6 A for one channel are possible by using the ZB8610 fan cartridge.

Further features:

- Two digital inputs per channel, can be used as latch inputs or for limit switches.
- One encoder interface per channel for incremental encoders with 5 V operating voltage.
- High microstepping for smooth and precise motor operation.

3.1.2 Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

3.1.2.1 General technical data

E-bus	
Electrical isolation	500 V (E-bus / I/O)
Distributed clocks	yes
Current consumption via E-bus	175 mA

Supply voltages	
Electronics supply voltage	U_P = 24 V_{DC} via the power contacts
Current consumption from the power contacts	25 mA + brake output current + encoder supply [1)]

[1)] The current consumption for the encoder supply is only approx. a quarter of the current consumption of the encoder because the encoder supply is regulated from 24 V to 5 V.

Environmental conditions	
Ambient temperature during operation	0 … +55 °C
Ambient temperature during storage	-25 … +85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating	IP20

Approvals/markings	
Approvals/markings	CE, cULus

3.1.2.2 Function-specific technical data

Overview	
Number of channels	2
Inputs per channel	2 x Digital latch input 1 x Encoder input
Digital outputs per channel	1 x Stepper motor 1 x Brake

Motor	
Motor type	Stepper motor, unipolar or bipolar
Motor supply	8 ... 48 V_{DC} (must be supplied via terminal points)
Output current	Without fan: • max. 6 A overall current, distributed over both channels. • max. 5 A per channel. With ZB8610 fan cartridge: • max. 10 A overall current, distributed over both channels. • max. 6 A per channel.
Step frequency	max. 16,000 full steps/s
Current controller frequency	32 kHz
Microstepping	16384 intermediate steps per full step

Encoder	
Encoder type	Incremental encoders
Input signal	5 V differential or single-ended/open collector
Signals	A, B, zero pulse, latch
Input frequency with 4-fold evaluation	Depending on the type of input signal, see chapter Selection of motor and feedback [▶ 35].
Encoder supply	5 V_{DC}, max. 300 mA in total across both channels

Digital inputs	
Nominal input voltage	24 V_{DC} (-15 %/+20 %)
Input filter	10 µs
Signal voltage "0"	-3 … +2 V
Signal voltage "1"	+3.7 … +28 V
Input current	typically 5 mA

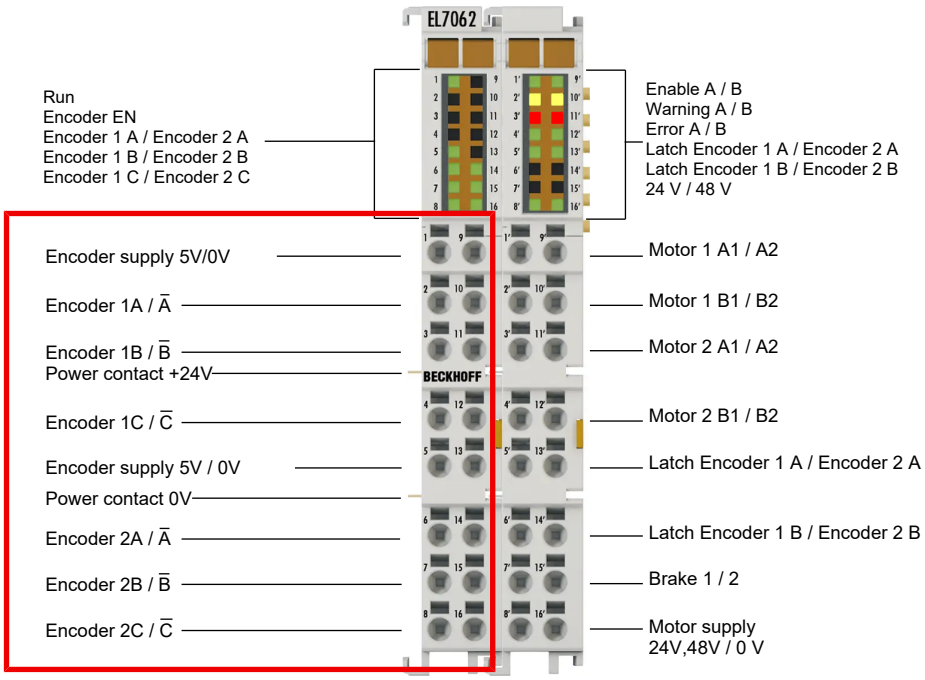
Brake	
Output voltage	24 V_{DC} from the power contacts
Output current	0.5 A

3.1.2.3 Housing data

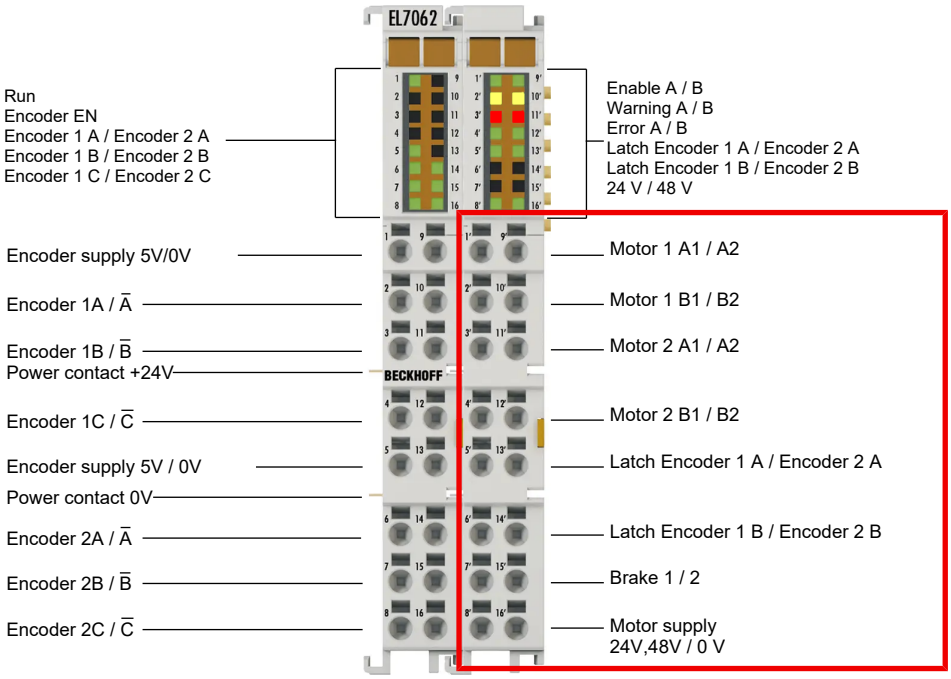
Housing data	
Design	compact HD (High Density) housing with signal LEDs
Weight	approx. 100 g
Installation position	Standard installation position [▶ 20]
Material	Polycarbonate
Dimensions (W x H x D)	24 mm x 100 mm x 68 mm
Installation	On 35 mm DIN rail, according to EN 60715. With lock.

3.1.3 Connection

Information on wiring can be found in the chapters Connection technology / wiring [▶ 26] and Shielding concept.



Terminal point	Name	Comment
1	5 V encoder supply	5 V output voltage to supply the encoder on channel 1.
2	Encoder 1 A	Encoder signal input “A” for channel 1
3	Encoder 1 B	Encoder signal input “B” for channel 1
4	Encoder 1 C	Encoder signal input "C" for channel 1, configurable as zero pulse input (factory setting) or as latch input.
5	5 V encoder supply	5 V output voltage to supply the encoder on channel 2.
6	Encoder 2 A	Encoder signal input “A” for channel 2
7	Encoder 2 B	Encoder signal input “B” for channel 2
8	Encoder 2 C	Encoder signal input "C" for channel 2, configurable as zero pulse input (factory setting) or as latch input.
9	0 V encoder supply	Ground connection for the encoder supply at terminal point 1.
10	Encoder 1 $\overline{A}$	Inverted input signal to "A" at terminal point 2.
11	Encoder 1 $\overline{B}$	Inverted input signal to "B" at terminal point 3.
12	Encoder 1 $\overline{C}$	Inverted input signal to "C" at terminal point 4.
13	0 V encoder supply	Ground connection for the encoder supply at terminal point 5.
14	Encoder 2 $\overline{A}$	Inverted input signal to "A" at terminal point 6.
15	Encoder 2 $\overline{B}$	Inverted input signal to "B" at terminal point 7.
16	Encoder 2 $\overline{C}$	Inverted input signal to "C" at terminal point 8.



NOTICE

Control and load voltage supply

The control and load voltage supplies must be both SELV or both PELV circuits. In the case of the PELV circuit, all-pole line protection is required for the control voltage.

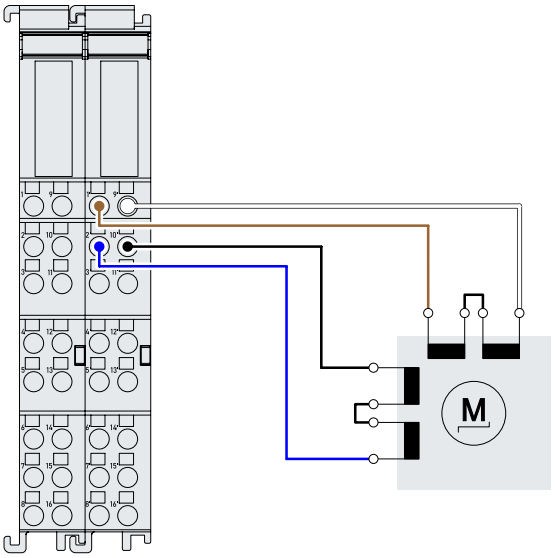
Terminal point	Name	Comment
1‘	Motor 1 A1	Connections for the motor windings.
2‘	Motor 1 B1	
3‘	Motor 2 A1	
4‘	Motor 2 B1	
5‘	Latch Encoder 1 A	Latch input A for channel 1.
6‘	Latch Encoder 1 B	Latch input B for channel 1.
7‘	Brake 1	Digital output for controlling a brake on channel 1.
8‘	Motor supply 24 V, 48 V	Input for the motor supply.
9‘	Motor 1 A2	Connections for the motor windings.
10‘	Motor 1 B2	
11‘	Motor 2 A2	
12‘	Motor 2 B2	
13‘	Latch Encoder 2 A	Latch input A for channel 2.
14‘	Latch Encoder 2 B	Latch input B for channel 2.
15‘	Brake 2	Digital output for controlling a brake on channel 2.
16‘	0 V	Ground potential for all terminal points 1' to 16'.

3.1.3.1 Connection examples

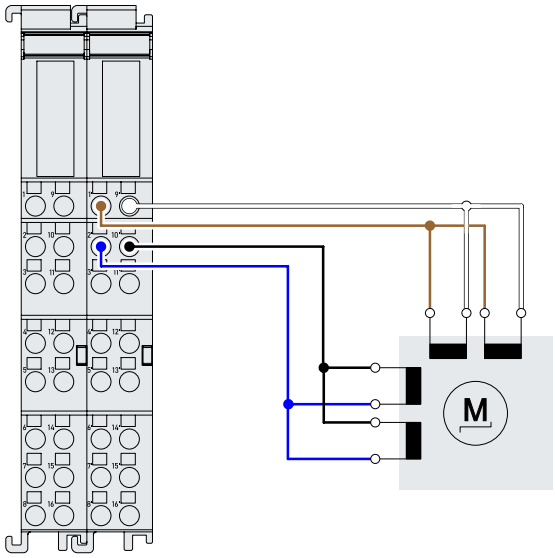
All connection examples are shown for channel 1 and can be transferred to channel 2.

Bipolar stepper motor

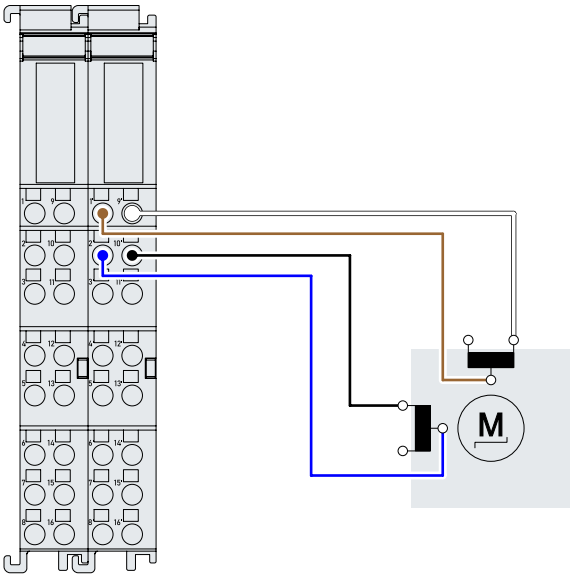
Serial connection



Parallel connection



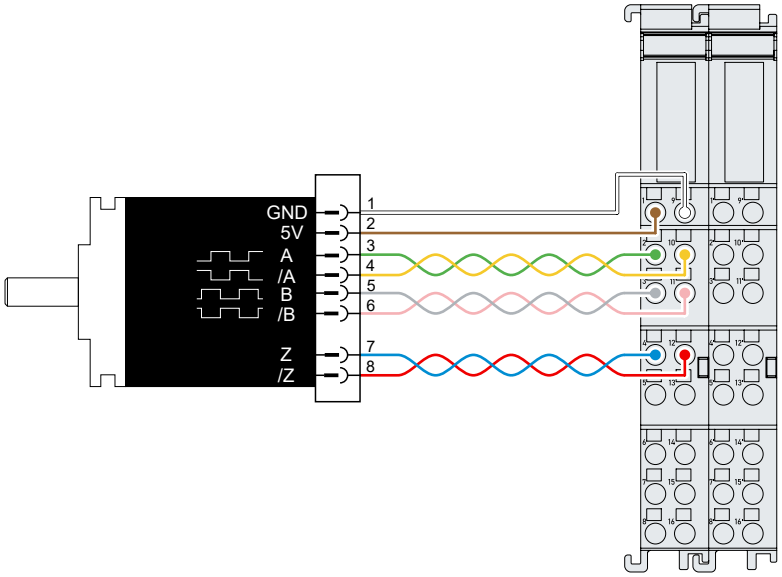
Unipolar stepper motor, bipolar control



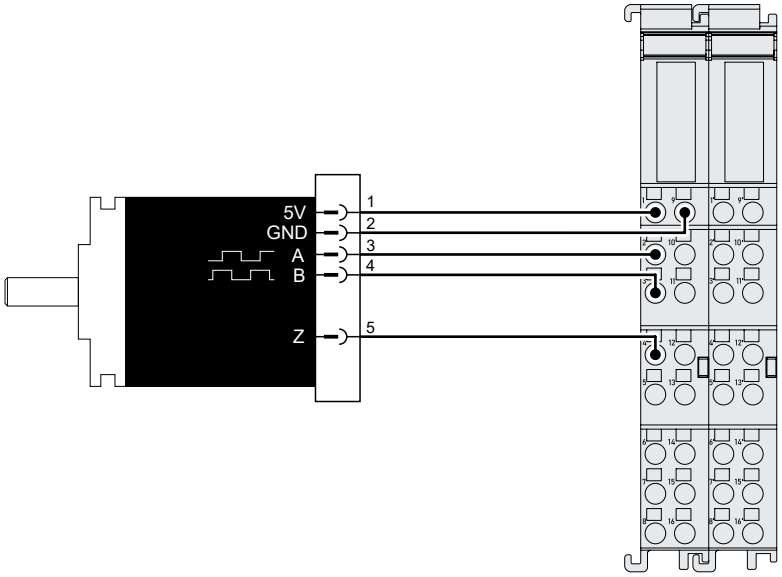
One half of each winding is controlled.

Encoder differential

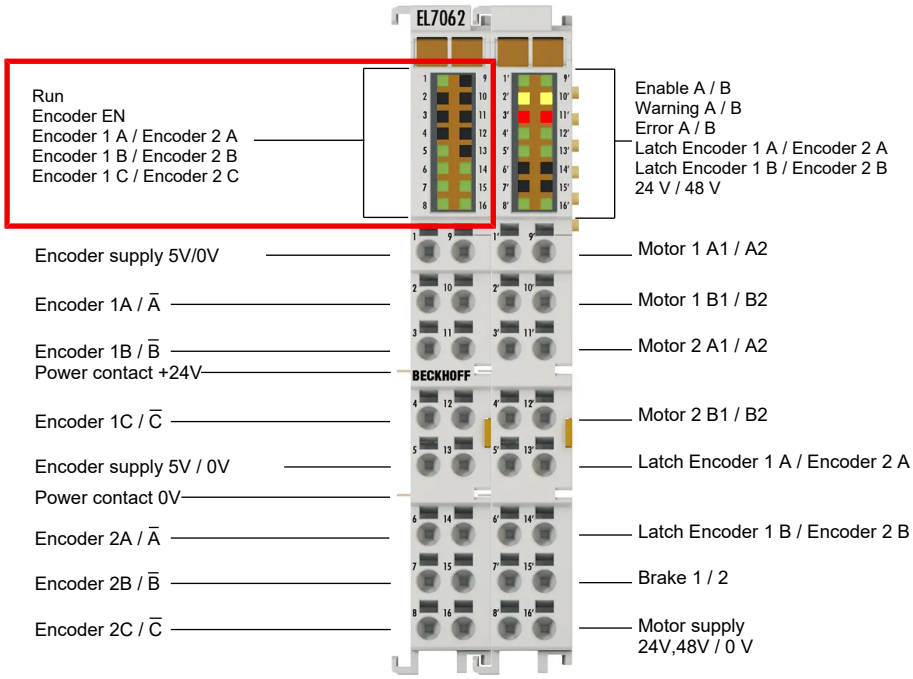
The core colors apply to a ZK4000-8200-2xxx encoder connection cable.



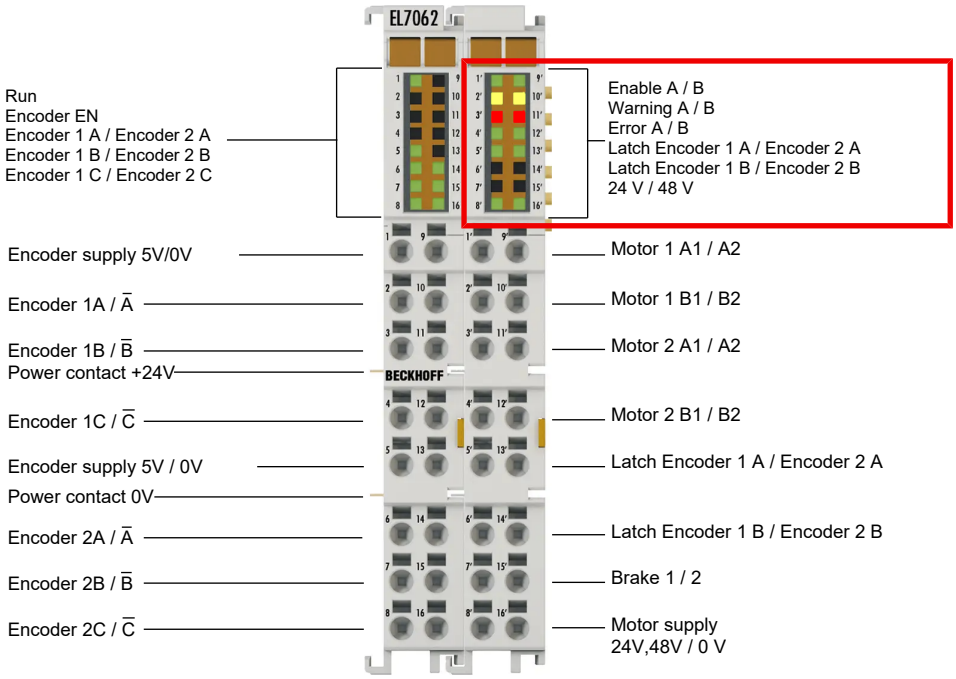
Encoder single-ended



3.1.4 Displays, diagnostics

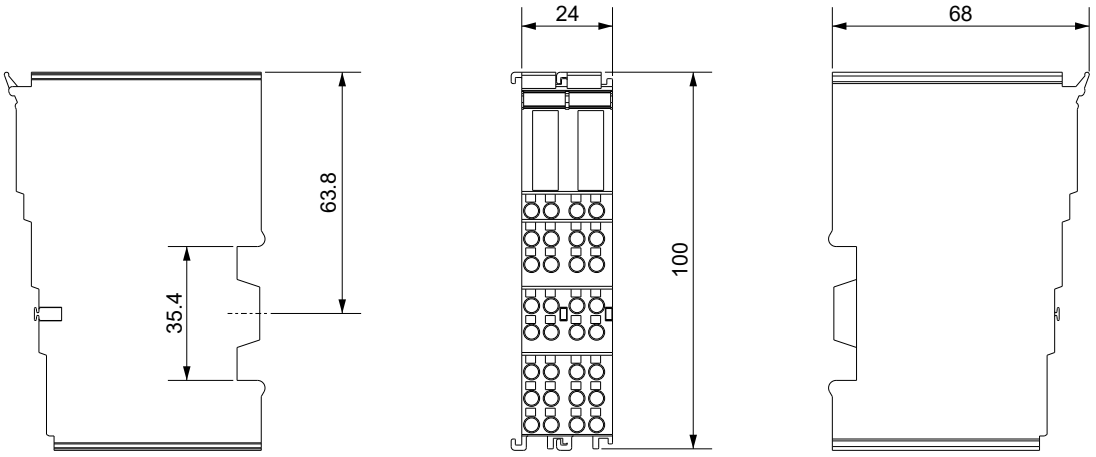


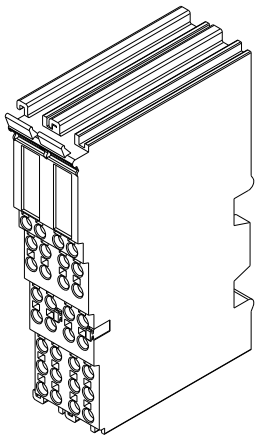
Display no.	Name	Comment	
1	Run	Status of the terminal in the EtherCAT network.	
		off	Status "Init"
		flashes	Status "Pre-Operational"
		single flash	Status "Safe-Operational"
		lit	Status "Operational"
2	--	--	
3	--	--	
4	--	--	
5	Encoder EN	Status of the encoder supply. Indicates that the encoder supply is present.	
6	Encoder 1 A	Signal display encoder signal A, channel 1	
7	Encoder 1 B	Signal display encoder signal B, channel 1	
8	Encoder 1 C	Signal display encoder signal C, channel 1	
9	--	--	
10	--	--	
11	--	--	
12	--	--	
13	--	--	
14	Encoder 2 A	Signal display encoder signal A, channel 2	
15	Encoder 2 B	Signal display encoder signal B, channel 2	
16	Encoder 2 C	Signal display encoder signal C, channel 2	



Display no.	Name	Comment
1‘	Enable A	Indicates that output stage channel 1 is enabled.
2‘	Warning A	Indicates that the channel has issued a warning.
3‘	Error A	Indicates that the channel is in error state.
4‘	Latch Encoder 1 A	Signal display latch input A for channel 1.
5‘	Latch Encoder 1 B	Signal display latch input B for channel 1.
6‘	--	--
7‘	--	--
8‘	24 V	Voltage display for the "electronic supply voltage" (power contacts)
9‘	Enable B	Indicates that output stage channel 2 is enabled.
10‘	Warning B	Indicates that the channel has issued a warning.
11‘	Error B	Indicates that the channel is in error state.
12‘	Latch Encoder 2 A	Signal display latch input A for channel 2.
13‘	Latch Encoder 2 B	Signal display latch input B for channel 2.
14‘	--	--
15‘	--	--
16‘	48 V	Voltage display for the motor supply.

3.1.5 Dimensions





All dimensions are given in millimeters.
The drawing is not true to scale.

4 Mounting and wiring

4.1 Instructions for ESD protection

NOTICE

Destruction of the devices by electrostatic discharge possible!

The devices contain components at risk from electrostatic discharge caused by improper handling.

- When handling the components, ensure that there is no electrostatic discharge; also avoid touching the spring contacts directly (see illustration).
- Contact with highly insulating materials (synthetic fibers, plastic films, etc.) should be avoided when handling components at the same time.
- When handling the components, ensure that the environment (workplace, packaging and persons) is properly earthed.
- Each bus station must be terminated on the right-hand side with the EL9011 or EL9012 end cap to ensure the degree of protection and ESD protection.

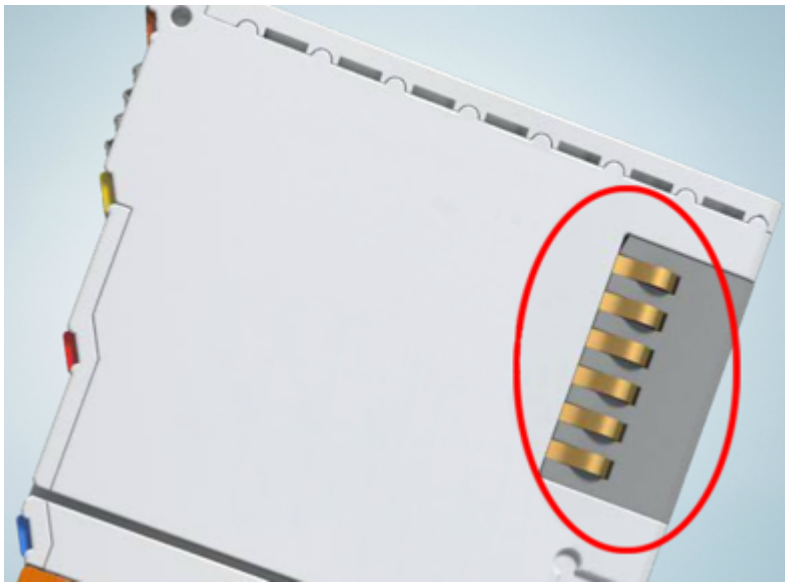


Fig. 1: Spring contacts of the Beckhoff I/O components

4.2 Mounting IP20 terminals

4.2.1 Installation position

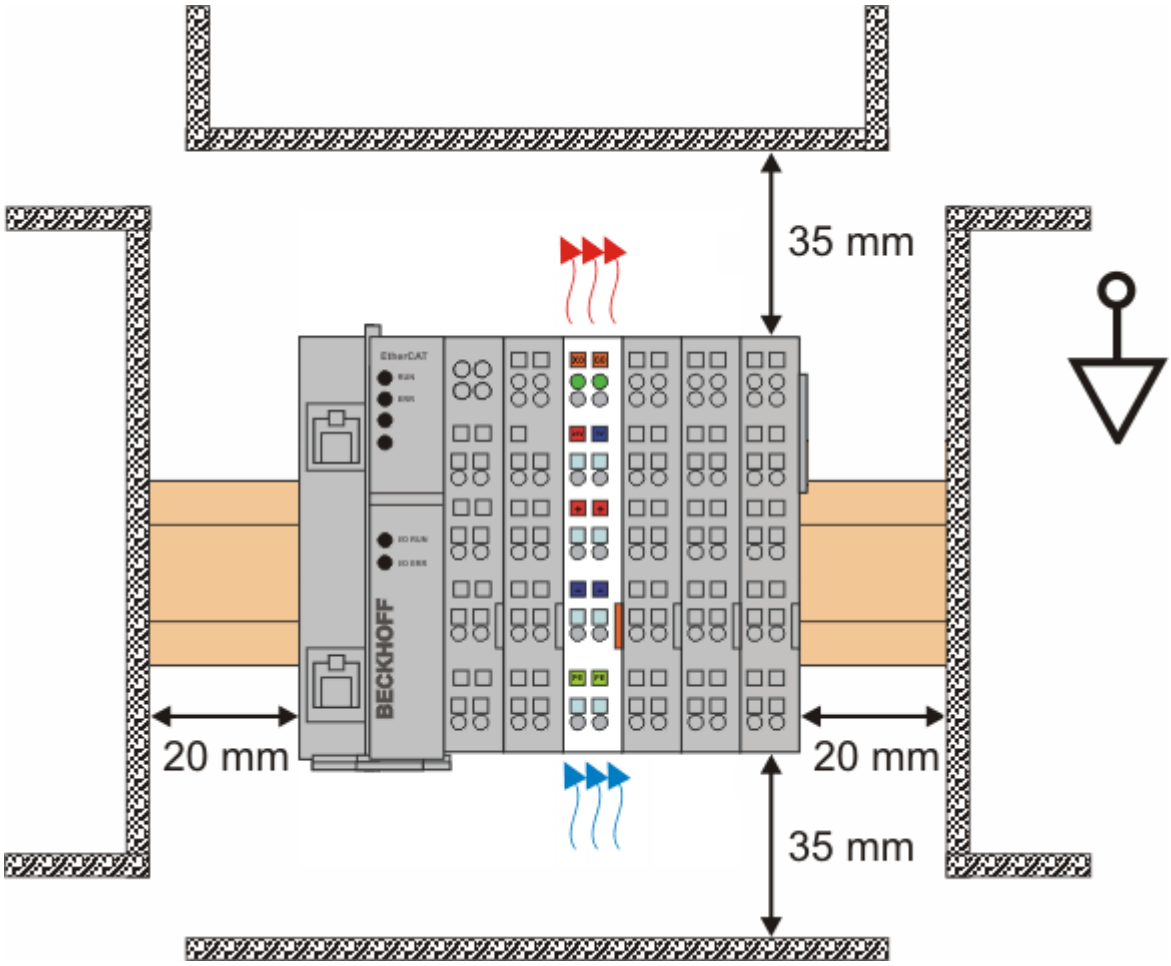
Standard installation position

Mount the EL7062 in the standard installation position. Standard installation position means:

- The mounting rail is mounted horizontally.
- The connection surfaces of the terminal are facing to the front.

The terminals are ventilated from below, which enables optimum cooling of the electronics through convection. "Below" is relative to the acceleration of gravity.

Recommended distances



4.2.2 Installation on mounting rails

⚠ WARNING

Risk of electric shock and damage of device!

Bring the bus terminal system into a safe, powered down state before starting installation, disassembly or wiring of the bus terminals!

The Bus Terminal system and is designed for mounting in a control cabinet or terminal box.

Assembly

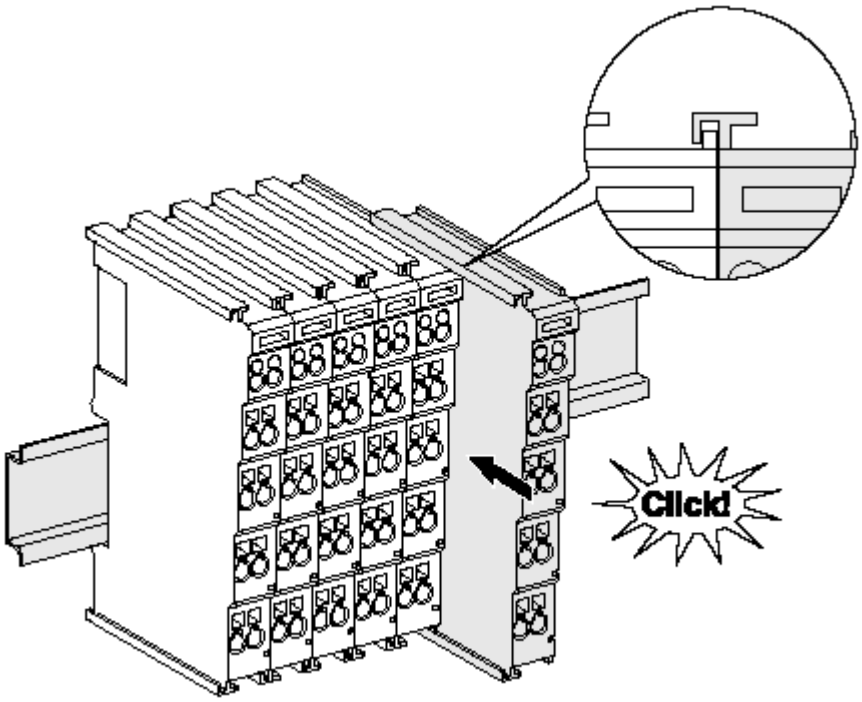


Fig. 2: Attaching on mounting rail

The bus coupler and bus terminals are attached to commercially available 35 mm mounting rails (DIN rails according to EN 60715) by applying slight pressure:

1. First attach the fieldbus coupler to the mounting rail.
2. The bus terminals are now attached on the right-hand side of the fieldbus coupler. Join the components with tongue and groove and push the terminals against the mounting rail, until the lock clicks onto the mounting rail.
   If the terminals are clipped onto the mounting rail first and then pushed together without tongue and groove, the connection will not be operational! When correctly assembled, no significant gap should be visible between the housings.

Fixing of mounting rails

The locking mechanism of the terminals and couplers extends to the profile of the mounting rail. At the installation, the locking mechanism of the components must not come into conflict with the fixing bolts of the mounting rail. To mount the mounting rails with a height of 7.5 mm under the terminals and couplers, you should use flat mounting connections (e.g. countersunk screws or blind rivets).

NOTICE

Ground the mounting rail!

Ensure that the mounting rail is sufficiently grounded.

Disassembly

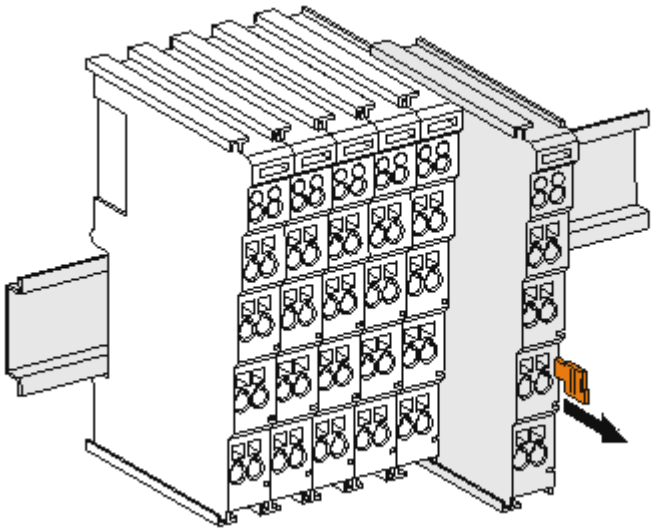


Fig. 3: Disassembling of terminal

Each terminal is secured by a lock on the mounting rail, which must be released for disassembly:

1. Pull the terminal by its orange-colored lugs approximately 1 cm away from the mounting rail. In doing so for this terminal the mounting rail lock is released automatically and you can pull the terminal out of the bus terminal block easily without excessive force.
2. Grasp the released terminal with thumb and index finger simultaneous at the upper and lower grooved housing surfaces and pull the terminal out of the bus terminal block.

Connections within a bus terminal block

The electric connections between the Bus Coupler and the Bus Terminals are automatically realized by joining the components:

- The six spring contacts of the E-Bus/K-Bus deal with the transfer of the data and the supply of the Bus Terminal electronics.
- The power contacts deal with the supply for the field electronics and thus represent a supply rail within the bus terminal block. The power contacts are supplied via terminals points on the Bus Coupler (up to 24 V) or for higher voltages via power feed terminals.

Power Contacts

During the design of a bus terminal block, the pin assignment of the individual Bus Terminals must be taken account of, since some types (e.g. analog Bus Terminals or digital 4-channel Bus Terminals) do not or not fully loop through the power contacts. Power Feed Terminals (EL91xx, EL92xx or KL91xx, KL92xx) interrupt the power contacts and thus represent the start of a new supply rail.

4.2.3 Positioning of passive Terminals

Hint for positioning of passive terminals in the bus terminal block

EtherCAT Terminals (ELxxxx / ESxxxx), which do not take an active part in data transfer within the bus terminal block are so called passive terminals. The passive terminals have no current consumption out of the E-Bus.
To ensure an optimal data transfer, you must not directly string together more than two passive terminals!

Examples for positioning of passive terminals (highlighted)

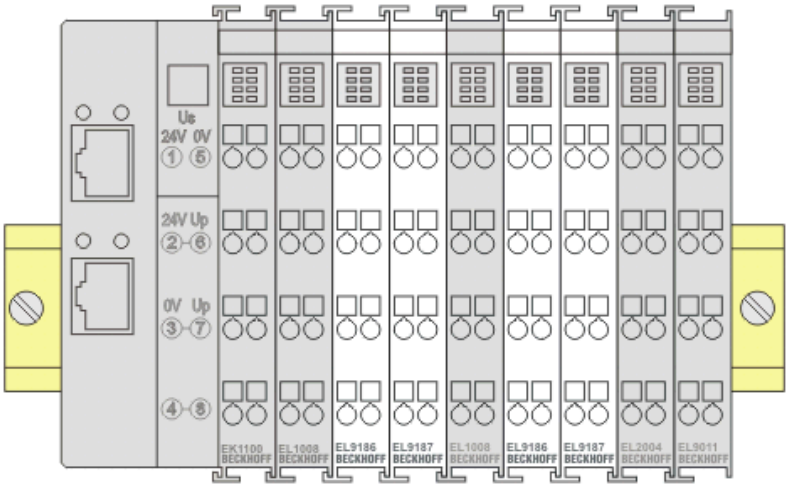


Fig. 4: Correct positioning

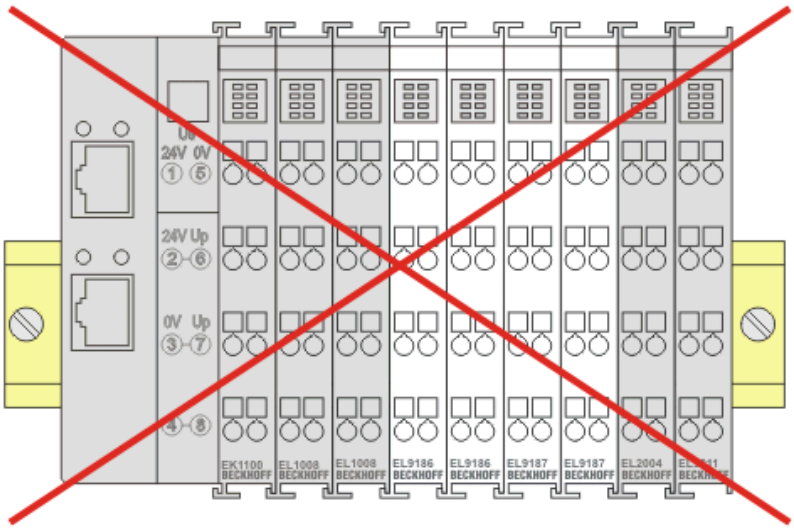


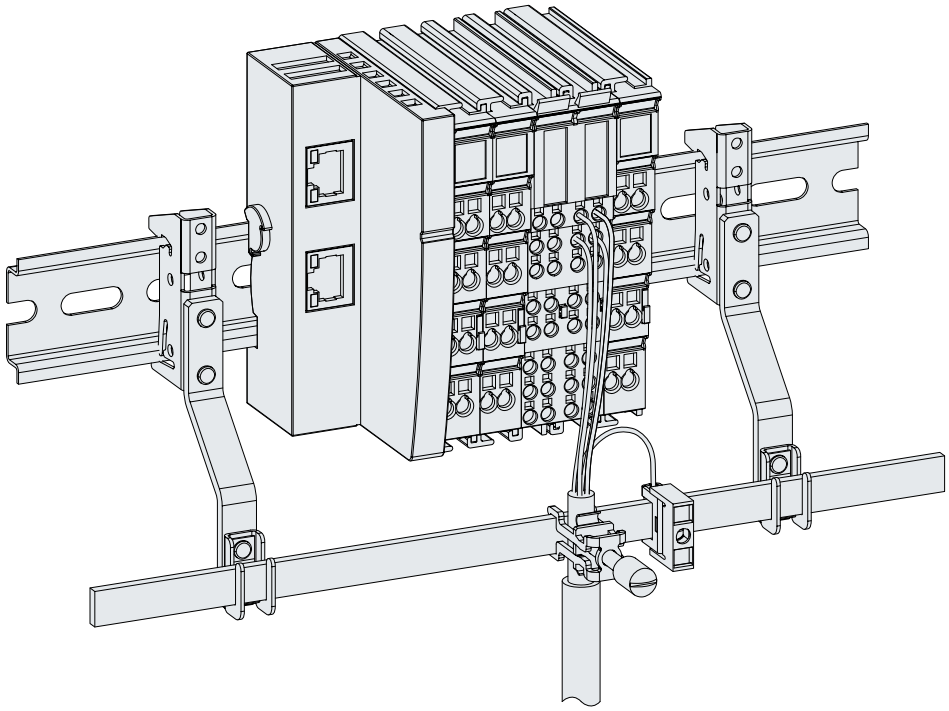
Fig. 5: Incorrect positioning

4.3 Shielding concept

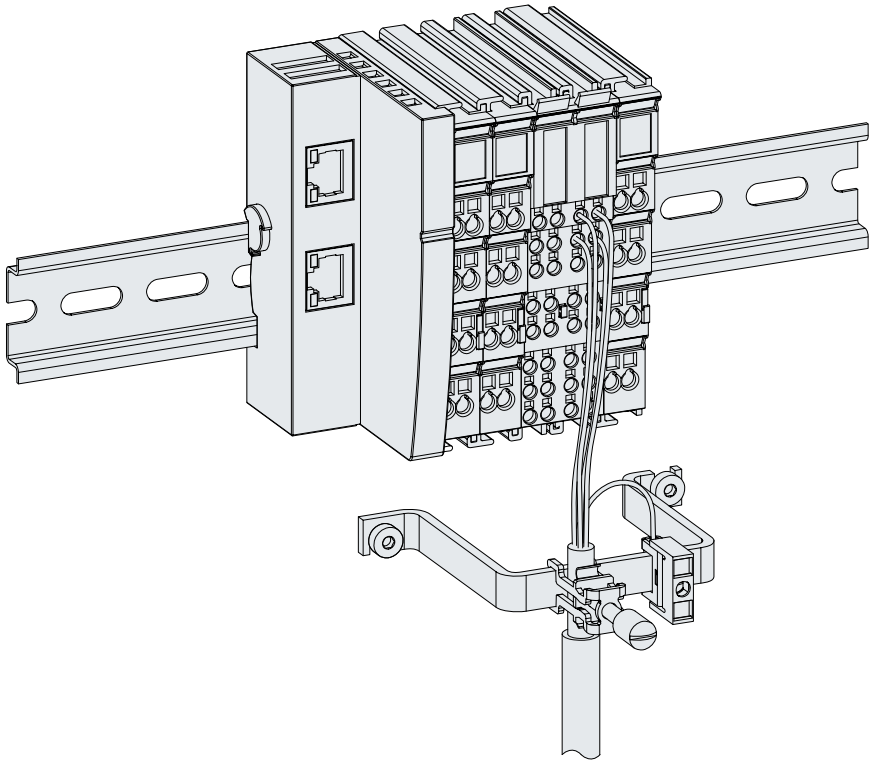
Use shielded cables for connecting the motor and feedback. Place the cable shields as close as possible to the terminal to minimize electromagnetic interference.

There are two ways to connect a cable shield directly to the terminal:

- With a ZB8510 shield busbar



- With a ZB8511 shield busbar clamp

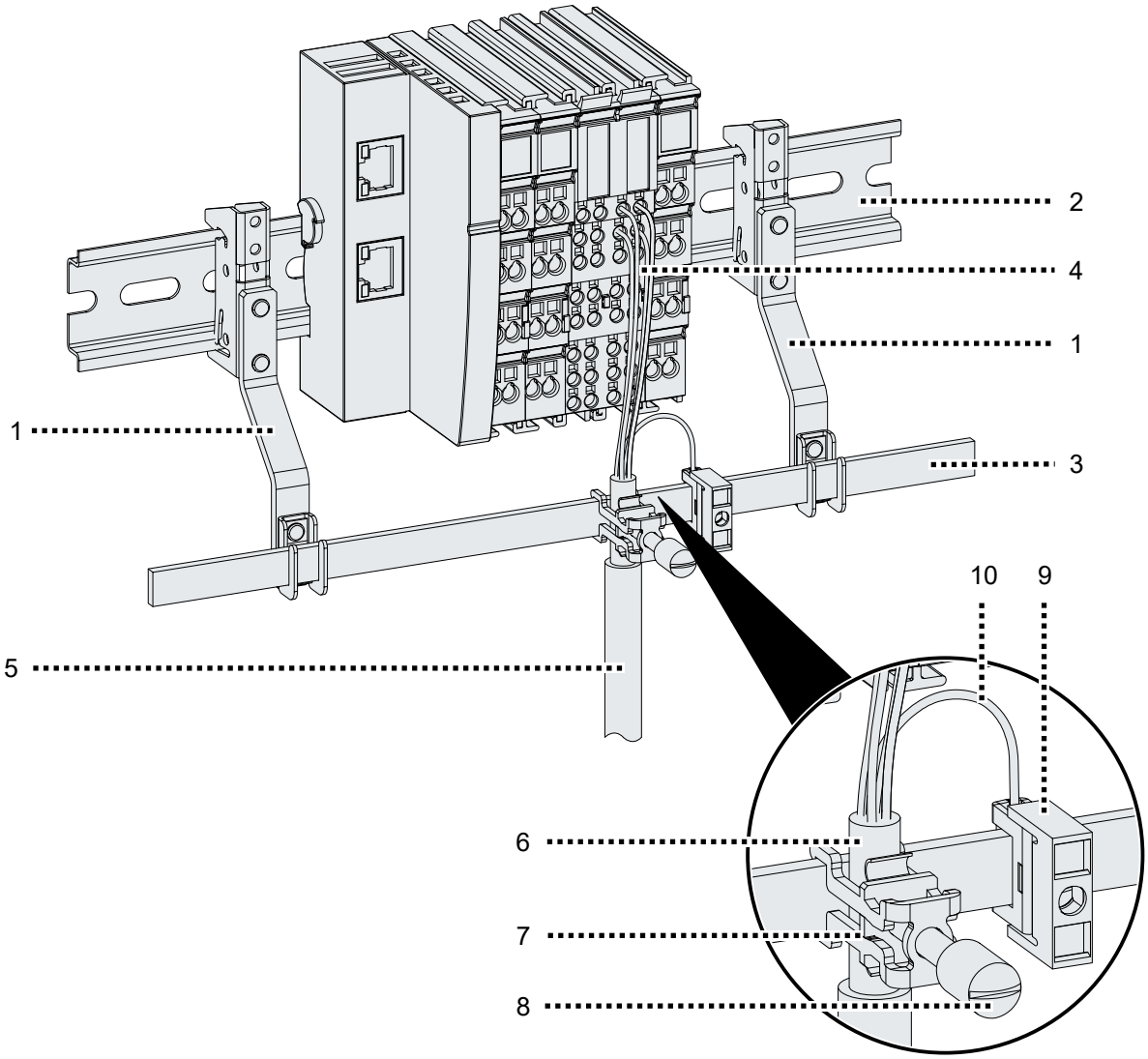


Mounting example

Example of a motor cable with PE core on a ZB8510 shield busbar.

Additional material required:

- 1 x ZB8500 | clamp strap [7]
- 1 x ZB8510 | shield busbar [3]
- 2 x ZB8520 | mounting rail holder [1]
- 1 x ZB8530 | U-clamp terminal [9]



Procedure:

1. Ensure that the DIN rail [2] is connected to the metal rear panel of the control cabinet over a large area.
2. Attach the mounting rail holders [1] to the DIN rail and mount the shield busbar [3] to them.
3. Strip the cable [5] so that the cable shield is exposed over a length of approx. 20 mm in the area of the shield busbar.
4. Wire the cores [4] of the cable to the terminal.
5. Attach the exposed cable shield [6] to the shield busbar using the clamp strap [7].
6. Tighten the knurled screw [8] to the stop.
7. Attach the U-clamp terminal [9] to the shield busbar.
8. Connect the PE wire [10] of the cable to the U-clamp terminal.

4.4 Connection technology / wiring

4.4.1 EMC measures

Follow these recommendations to best avoid electromagnetic interference.

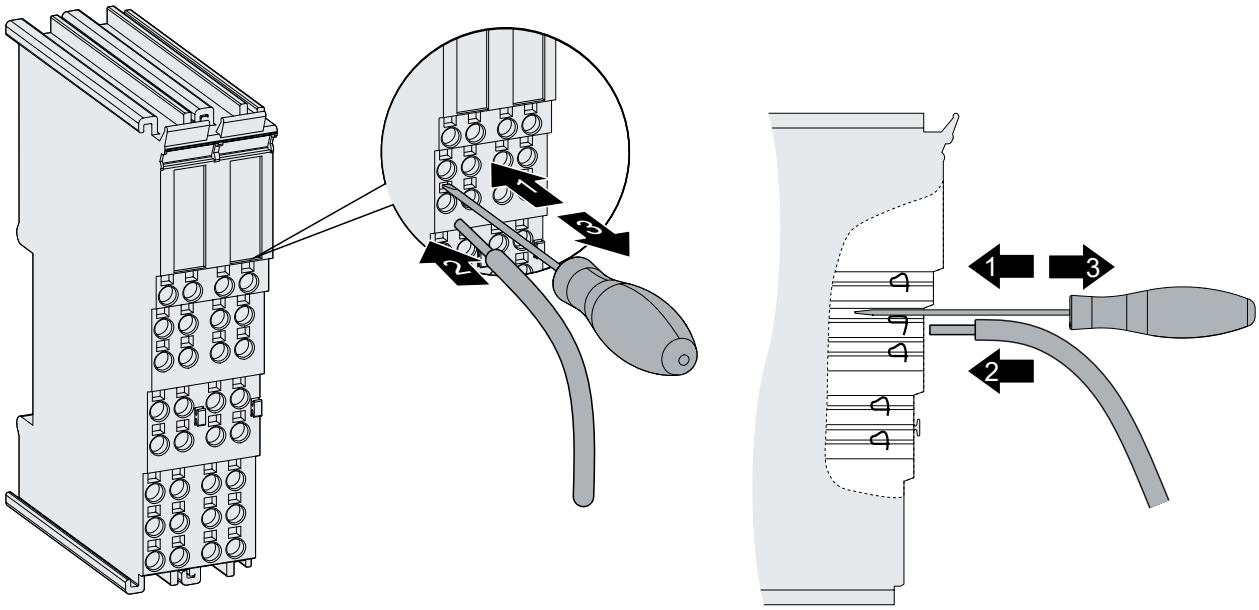
- Use shielded cables and ground cable shields. See chapter Shielding concept.
- Keep individual wires as short as possible.
- Twist the wires of differential feedback signals.

4.4.2 Wiring

⚠ WARNING

Risk of electric shock and damage of device!

Bring the bus terminal system into a safe, powered down state before starting installation, disassembly or wiring of the bus terminals!



Procedure for connecting a wire to a terminal point:

1. Open the terminal point by pressing a screwdriver straight into the square opening above the terminal point as far as it will go.
   Do not turn or move the screwdriver back and forth, do not lever it.
2. Insert the wire into the round terminal opening.
3. Remove the screwdriver.
   ⇨ The terminal point closes automatically, holding the wire securely and permanently.

You can connect solid conductors using the direct plug-in technique. This means that you can simply insert the conductor into the terminal point after stripping the insulation.

Permissible conductor cross-sections

Cable cross-section (solid)	0.08 ... 1.5 mm^2
Cable cross-section (stranded wire)	0.25 ... 1.5 mm^2
Cable cross-section (core with ferrule)	0.14 ... 0.75 mm^2
Cable cross-section (ultrasonically compacted stranded wire)	only 1.5 mm^2
Strip length	8 ... 9 mm

5 Technical information

5.1 Functional technology

5.1.1 Stepper motor

Stepper motors are electric motors and are comparable with synchronous motors. The rotor is designed as a permanent magnet, while the stator consists of a coil package. In contrast to synchronous motors, stepper motors have a large number of pole pairs. In a minimum control configuration, the stepper motor is moved from pole to pole, or from step to step.

Stepper motors have been around for many years. They are robust, easy to control, and provide high torque. In many applications, the step counting facility saves expensive feedback systems. Even with the increasingly widespread use of synchronous servomotors, stepper motors are by no means "getting long in the tooth". They are considered to represent mature technology and continue to be developed further in order to reduce costs and physical size, increase torque and improve reliability.

5.1.1.1 Stepper motor parameters

Torque

Refers to the maximum motor torque at different speeds. This parameter is usually represented by a characteristic curve. Stepper motors have comparatively high torque in the lower speed range. In many applications, this enables them to be used directly without gearing. Compared with other motors, stepper motors can quite easily provide a holding moment of the same order of magnitude as the torque.

Speed

Stepper motors have low maximum speed, which is usually specified as a maximum step frequency.

Nominal voltage, supply voltage and winding resistance

In steady state, the rated current flows at rated voltage, depending on the winding resistance. This voltage should not be confused with the supply voltage of the power output stage.
If the supply voltage falls below the nominal voltage, the power output stage can no longer apply the full current, resulting in a loss of torque. It is desirable to aim for systems with small winding resistance and high supply voltage in order to limit warming and achieve high torque at high speeds.

Number of phases

Motors with 2 to 5 phases are common. The EL7062 supports 2-phase motors.

Resonance

At certain speeds, stepper motors run less smoothly. This phenomenon is particularly pronounced if the motor runs without load. Under certain circumstances, it may even stop. This is caused by resonance. A distinction can roughly be made between

- resonances in the lower frequency range up to approx. 250 Hz and
- resonances in the medium to upper frequency range.

Resonances in the medium to upper frequency range essentially result from electrical parameters such as inductance of the motor winding and supply line capacity. They can be controlled relatively easily through high pulsing of the control system.

Resonances in the lower range essentially result from the mechanical motor parameters. Apart from their impact on smooth running, such resonances can lead to significant loss of torque, or even loss of step of the motor, and are therefore particularly undesirable.
In principle, the stepper motor represents an oscillatory system (comparable to a mass/spring system), consisting of the moving rotor with a moment of inertia and a magnetic field that creates a restoring force that

acts on the rotor. Moving and releasing the rotor creates a damped oscillation. If the control frequency corresponds to the resonance frequency, the oscillation is amplified so that in the worst case the rotor no longer follows the steps and oscillates back and forth between two detents.
The EL7062 prevents this effect with a SinCos-shaped current profile for almost all standard motors. The rotor is not switched from step to step, i.e. it no longer jumps to the next position, but instead passes through intermediate steps (microsteps), i.e. the rotor is gently guided from one step to the next. The usual loss of torque at certain speeds is avoided, and operation can be optimized for the particular application. This means that the lower speed range, where particularly high torque is available, can be fully utilized.

Step angle

The step angle indicates the angle travelled during each step. Typical values are 3.6°, 1.8° and 0.9°. This corresponds to 100, 200 and 400 steps per motor revolution. Together with the downstream transmission ratio, this value is a measure for the positioning accuracy. For technical reasons, the step angle cannot be reduced below a certain value. The positioning accuracy can only be increased mechanically through the transmission ratio. Microstepping is an elegant solution for increasing positioning accuracy. The smaller, "artificial" step angle has another positive effect: The drive can be operated at a higher speed with the same accuracy. The maximum speed is unchanged, despite the fact that the drive operates at the limit of mechanical resolution.

5.1.1.2 Selecting a stepper motor

1. Determine the required positioning accuracy and hence the step resolution. The first task is to determine the maximum resolution that can be achieved. The resolution can be increased via mechanical gear reduction devices such as spindles, gears or toothed racks. Microstepping must also be taken into account.
2. Determine mass m and moments of inertia (J) of all parts to be moved.
3. Calculate the acceleration resulting from the temporal requirements of the moved mass.
4. Calculate the forces from mass, moment of inertia, and the respective accelerations.
5. Convert the forces and velocities to the motor axis, taking account of efficiencies, moments of friction and mechanical parameters such as transmission ratio. It is often best to start the calculation from the last component, usually the load. Each further element transfers a force and velocity and leads to further forces or torques due to friction. During positioning, the sum of all forces and torques acts on the motor shaft. The result is a velocity/torque curve that the motor has to provide.
6. Using the characteristic torque curve, select a motor that meets these minimum requirements. The moment of inertia of the motor has to be added to the complete drive. Verify your selection. In order to provide an adequate safety margin, the torque should be oversized by 20% to 30%. The optimization is different if the acceleration is mainly required for the rotor moment of inertia. In this case, the motor should be as small as possible.
7. Test the motor under real application conditions: The housing temperatures must be monitored during continuous operation. If the test results do not confirm the calculations, check the assumed parameters and boundary conditions. It is important to also check side effects such as resonance, mechanical play, settings for the maximum operation frequency and the ramp slope.
8. The drive can be optimized to increase performance through various measures: Selection of lighter materials, hollow bodies, instead of solid material, and reduction of mechanical masses. The controller can also have significant influence on the behavior of the drive. The terminal enables operation with different supply voltages. The characteristic torque curve can be extended by increasing the voltage. In this case, a current increase factor can supply a higher torque at the crucial moment, while a general reduction of the current can significantly reduce the motor temperature. For specific applications, it may be advisable to use a specially adapted motor winding.

6 Short guide to commissioning

This quick guide describes the basic commissioning of the first channel of an EL7062 in TwinCAT 3 with the Drive Manager 2.
The quick guide does not claim to be complete.

Each chapter builds on the previous chapter. Proceed step by step in the given order.

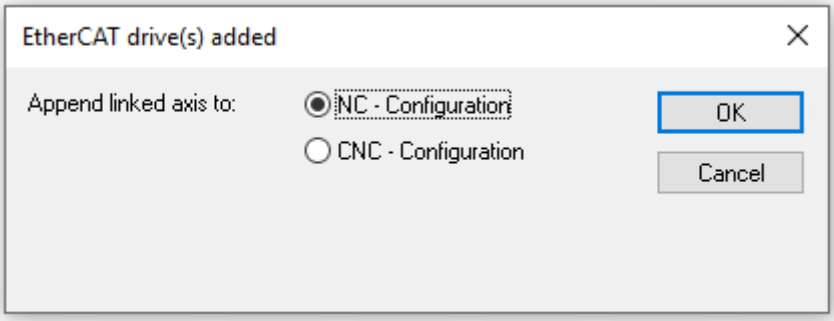
6.1 Requirements

Make sure that the following software is installed:

- TwinCAT from version 3.1, Build 4024.7 or higher. Download
- TE5950 | TwinCAT 3 Drive Manager 2 from Setup 1.1.88, DM2 1.1.70.0. Download

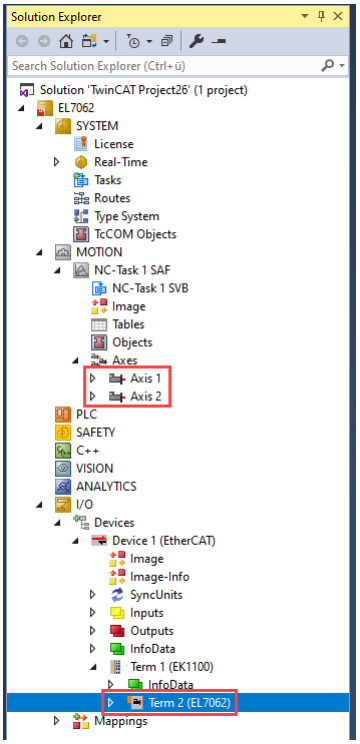
6.2 Integrating into a TwinCAT project

1. Include EL7062 in the I/O configuration of a TwinCAT project. Optional scanning or manual
   ⇨ In the course of the integration, a dialog box appears:



2. Select “NC - Configuration” and click on “OK”

⇨ The EL7062 is integrated into the I/O configuration and the NC configuration of your TwinCAT project



NOTICE

The internal memory may contain incorrectly set parameters

Risk of defect.

- Before commissioning, reset the terminal to the factory settings. See chapter Restoring the delivery state [▶ 47].

6.3 Configuration using the Drive Manager 2

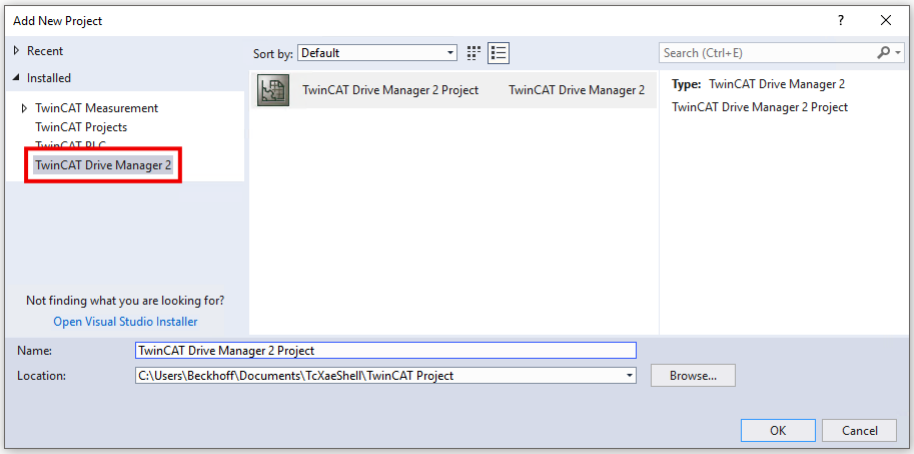
The Drive Manager 2 is a tool for commissioning drive axes in TwinCAT 3. Further information can be found here:

- Drive Manager 2 product page
- TwinCAT 3 Drive Manager 2 - Short commissioning.

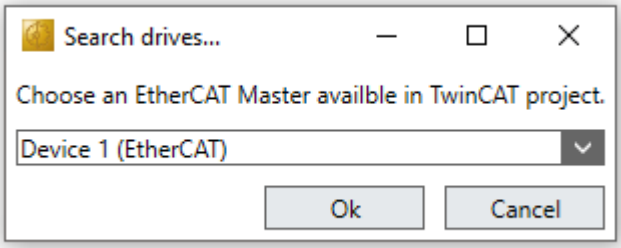
6.3.1 Creating a Drive Manager 2 project

Proceed as follows to create the project:

1. Select the menu item File > Add > New Project in TwinCAT
   ⇨ A dialog box opens.
2. Select “Installed” > “TwinCAT Drive Manager 2” in the dialog box on the left-hand side and click on OK



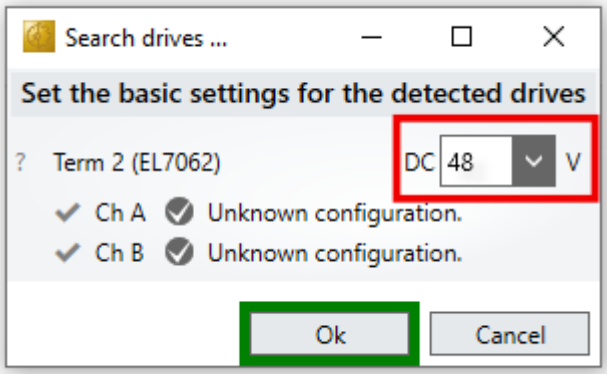
⇨ If the TwinCAT project contains several EtherCAT masters, the following dialog box appears:



Choose the EtherCAT master to which the EL7062 is connected

⇨ A dialog box opens.

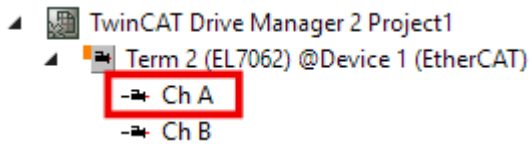
3. Set the motor supply in the dialog box and click on "OK".



⇨ The project was created.
⇨ The EL7062 was integrated into the project.

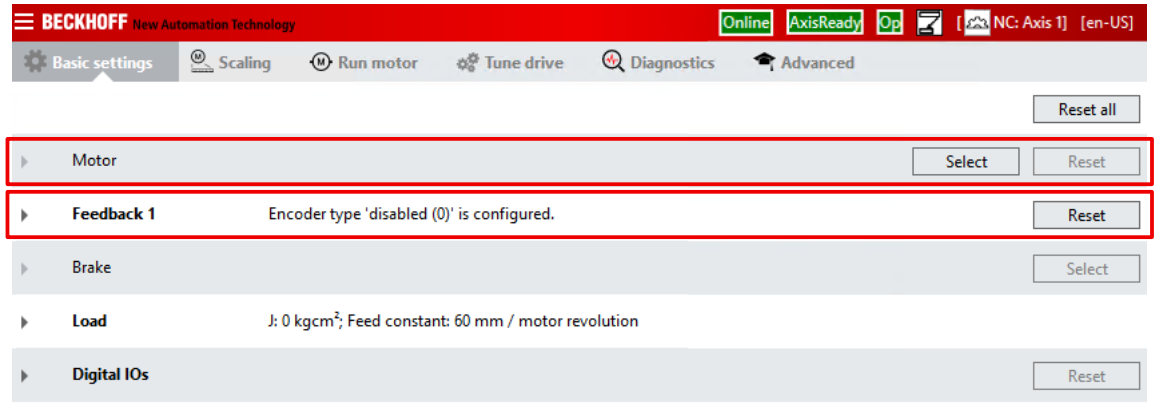
6.3.2 Selection of motor and feedback

1. In the Solution Explorer, expand the tree under the "Drive Manager 2 Project".
2. Double click on "Ch A".



⇨ The Drive Manager 2 opens.

3. Select motor and feedback.



Feedback

When selecting the feedback, observe the following general conditions, especially the maximum input frequency:

Signal type	Max. input frequency [1)]	Current sink 2.5 mA	Signal level Low	Signal level High	Comment
RS422 differential	4 million inc/s	no	U_{diff} < -0.45 V	U_{diff} > +0.45 V	-
TTL single ended	250 kInc/s	yes	< 0.8 V	> 3.0 V	-
TTL single ended – input filters disabled	1 million inc/s	yes	< 0.8 V	> 3.0 V	Higher signal frequency possible. More sensitive to interference.
Open collector	125 kInc/s	no	< 0.8 V	> 2.0 V	Encoder switches to ground

[1)] with 4-fold evaluation.

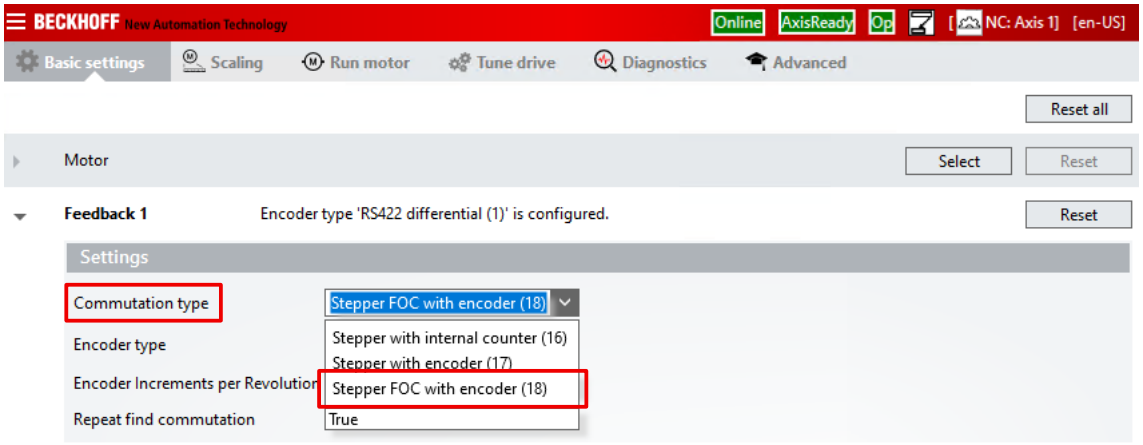
Field-oriented control

Field-oriented control can be activated if feedback is used with at least 4096 counting steps per revolution. This minimum number of counting steps can be achieved, for example, with an incremental encoder with 1024 pulses per revolution, since 4096 steps per revolution are counted due to the 4-fold evaluation (quadrature decoder).

Advantages:

- More efficient control
- Load-dependent current; this enables homing "on block", for example

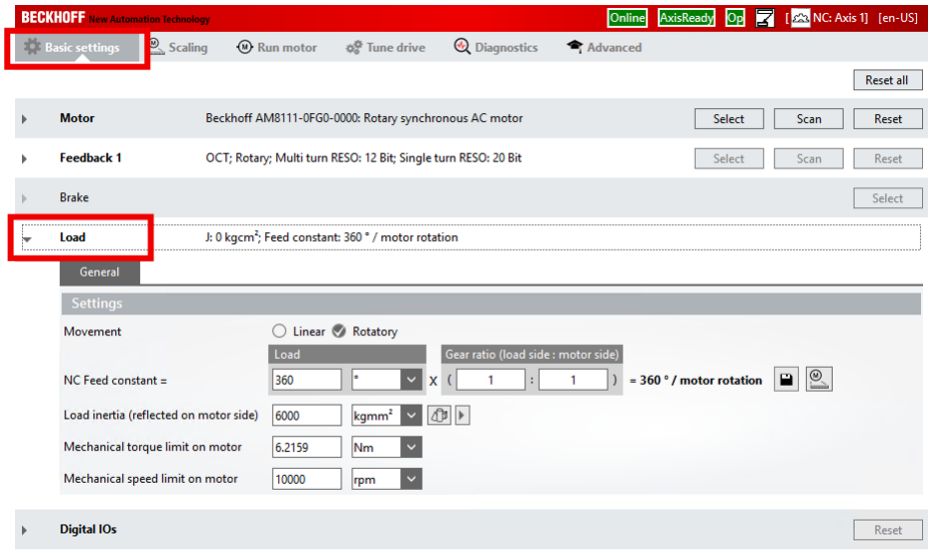
To activate field-oriented control, select "Stepper FOC with encoder" in the "Commutation type" field:



Note: The field-oriented control performs a commutation finding for each axis enable, during which the shaft moves a few degrees in both directions. The rotor must be able to turn in both directions.

6.3.3 Setting the load parameters

1. In Drive Manager 2, open the menu item "Load" in the "Basic Settings" tab.



⇨ You can set the following parameters here:

NC Feed constant

The NC Feed constant defines the traveled distance of the load per revolution of the motor shaft. With the NC Feed constant you can, for example, map the transmission ratio of a gear unit.

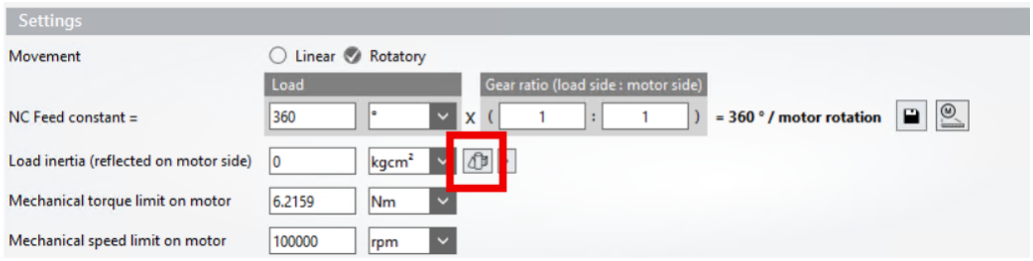
Example calculation for a rotary NC axis with transmission ratio i = 10 (reduction ratio):

$$NC\ feed\ constant = \frac{360^\circ}{i} = 36^\circ$$

Load inertia (reflected on motor side)

If you know the moment of inertia of the load, proceed as follows:

1. Enter the moment of inertia.
   Tip: if you are using a gear unit, use the moment of inertia calculator:



2. Confirm the entry with [Enter].
   ⇨ A button appears: "Recalculate VCtrl Kp and reset Tn".
3. Click the "Recalculate VCtrl Kp and reset Tn" button.

⇨ The Drive Manager 2 calculates suitable controller parameters for the velocity controller.

Mechanical torque limit on motor

This value is the upper limit for the motor shaft torque. Set the value according to the requirements of the application.
Note: If you use a gear unit, the torque at the output of the gear unit may be higher than at the motor shaft.

Mechanical speed limit on motor

This value is the upper limit for the speed of the motor shaft. Set the value according to the requirements of the application.
Note: If you use a gear unit, the speed at the output of the gear unit may be higher than at the motor shaft.

Transfer parameters to the NC

Once the parameters have been set, they must be transferred to TwinCAT NC.
In this "Quick Start Guide to Commissioning", this is done in the next step "Test run" by enabling the TwinCAT configuration.

6.4 Test run

⚠ WARNING

Danger due to movements of the motor

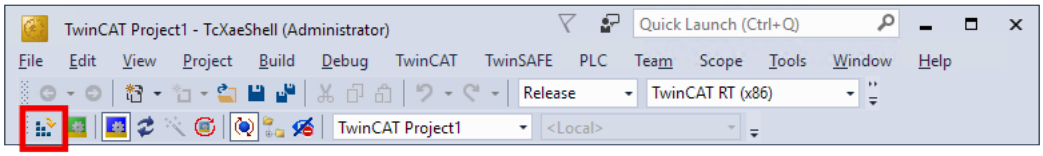
The motor moves during the test run.

Serious injuries and property damage are possible.

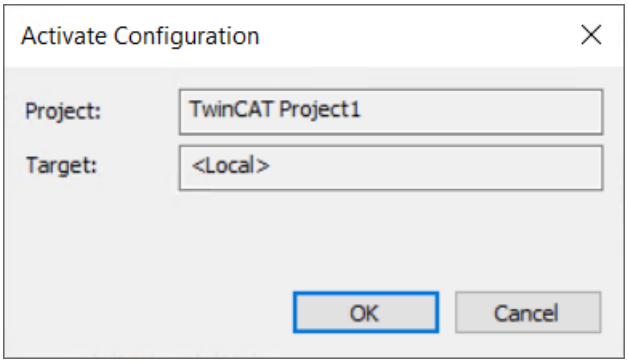
- Make sure that all parameters are set correctly.
- Ensure that the drive can move as required without endangering persons or the plant.

6.4.1 Preparation

1. Activate the TwinCAT configuration

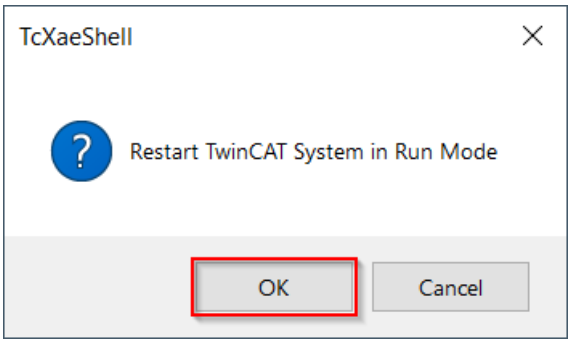


⇨ A dialog box appears.

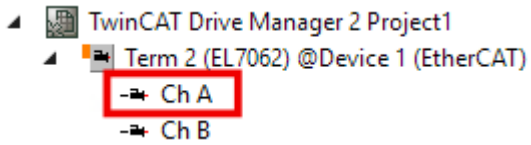


2. Confirm with OK

⇨ A dialog box appears.



3. Confirm with OK
4. Double-click on “Ch A” in the Solution Explorer

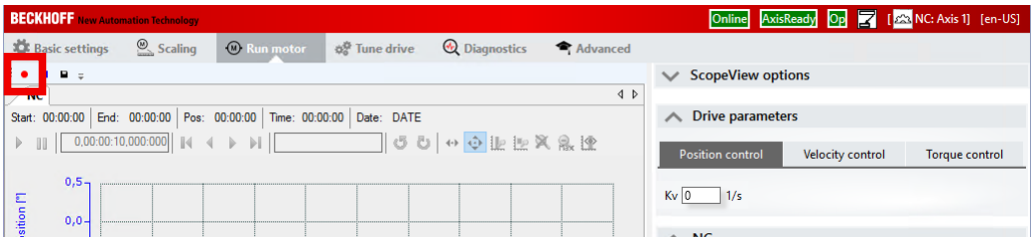


5. Select the menu "Run motor"

⇨ A warning message appears.

6. Read and follow the warning

7. Acknowledge the warning with “OK”
   If “OK” cannot be clicked, the Drive Manager 2 will display the reason in blue letters.
   ⇨ The “Run Motor” window appears.
8. Click the "Start record" button.

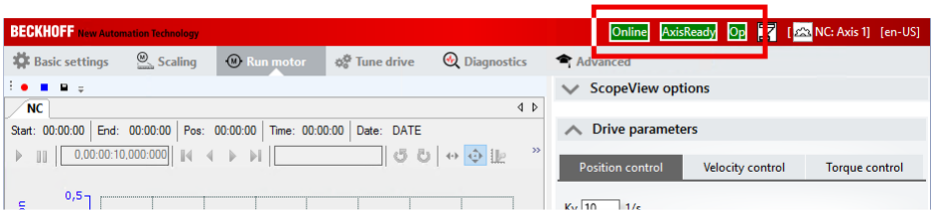


⇨ The Scope View records position, velocity and following error.

6.4.2 Axis enable

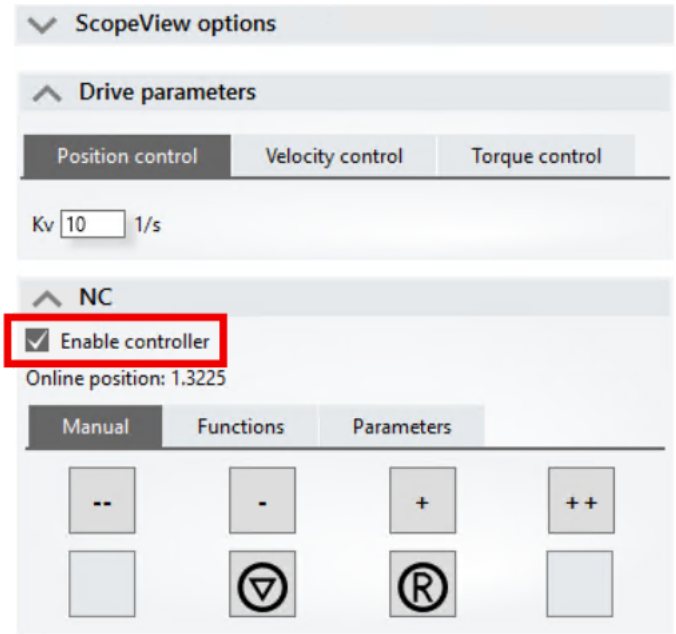
The axis only executes motion commands when it is enabled. Enable the axis as follows:

1. Check whether the icons “Online”, “AxisReady” and “Op” are in the title bar of the Drive Manager 2 and whether they are highlighted in green



⇨ If so: Drive Manager 2 is ready.

2. On the right side under "NC" activate the checkbox "Enable controller"



⇨ The axis is enabled.

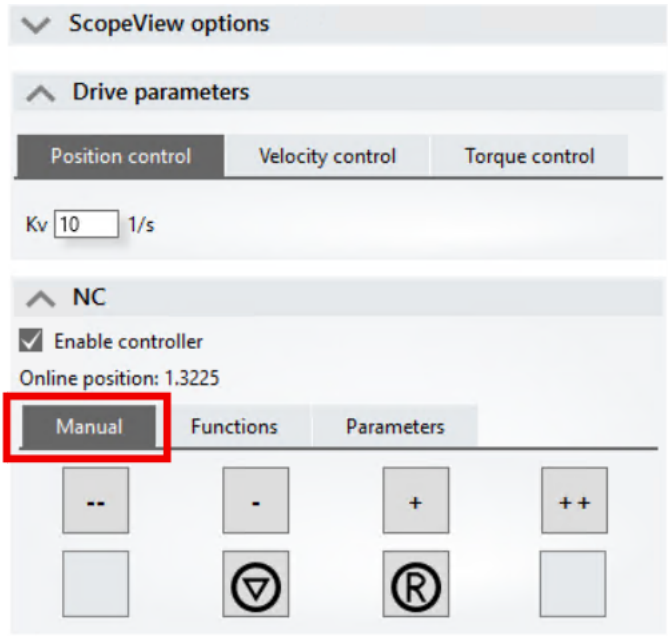
⇨ If field-oriented control is activated, the axis for finding the commutation moves back and forth a few degrees.

⇨ The LED 2' "Enable A" on the terminal housing lights up green.

6.4.3 Manual operation

You can move the motor as you wish in manual mode.

The controls for manual operation are located on the right side of the window under "NC" > "Manual".



The following buttons are available:

Button	Explanation
-	Travel in the negative direction at 5% of the maximum velocity.
--	Travel in the negative direction at 30% of the maximum velocity.
+	Travel in the positive direction at 5% of the maximum velocity.
++	Travel in the positive direction at 30% of the maximum velocity.
▽	Stop the NC axis
R	Reset an error from the Motion NC

The motor only runs as long as a button is pressed. As soon as you release the mouse button, the motor stops.

Behavior in case of an error

If an error occurs, the following symbol appears in the user interface:

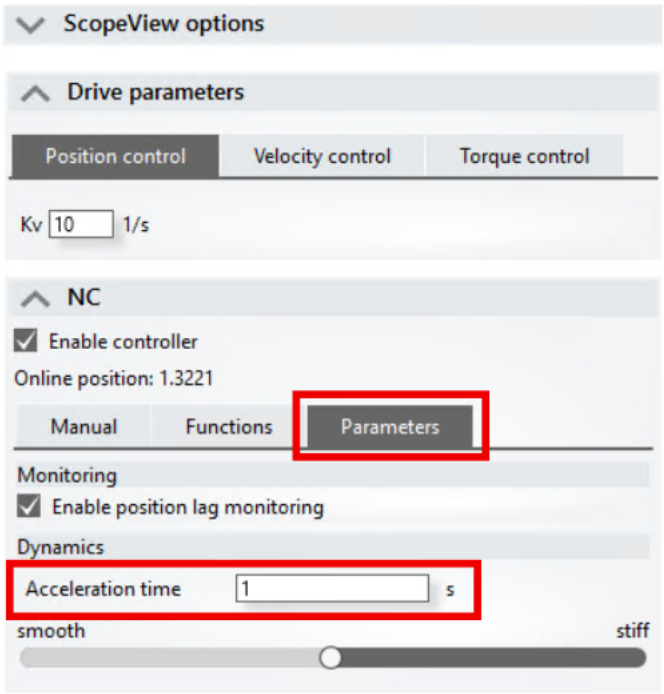


- Move the mouse cursor over the symbol to get more information about the error.
- Click the "R" button to acknowledge all errors.
  If the error cannot be acknowledged, check the messages in the tab "Diagnostics".

6.4.3.1 Dynamics

The acceleration time is set quite high in the factory setting. The motor accelerates only slowly.

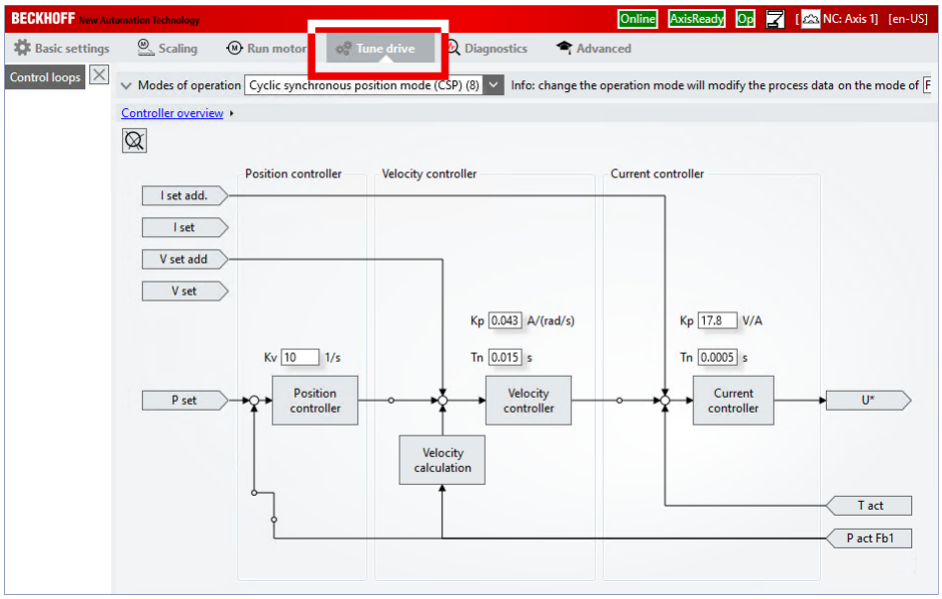
You can set the acceleration time under "Parameters":



Lower acceleration time increases the probability that a following error will occur. If necessary, increase the permissible following error. See chapter Following error monitoring [▶ 50].

6.5 Controller optimization

You can display the controller structure in Drive Manager 2 by selecting the "Tune Drive" menu. Click on individual elements in the controller structure to display their internal structure.



The CSP operation mode is set in the factory settings. Three controllers are active in this operation mode:

- Current controller
- Velocity controller
- Position controller

The following chapters describe the optimization of the individual controllers in the CSP operation mode.

Further information on the operation modes can be found in chapter Controller operation mode.

6.5.1 Optimization of the current controller

The current controller does not usually need to be optimized.

6.5.2 Optimization of the velocity controller

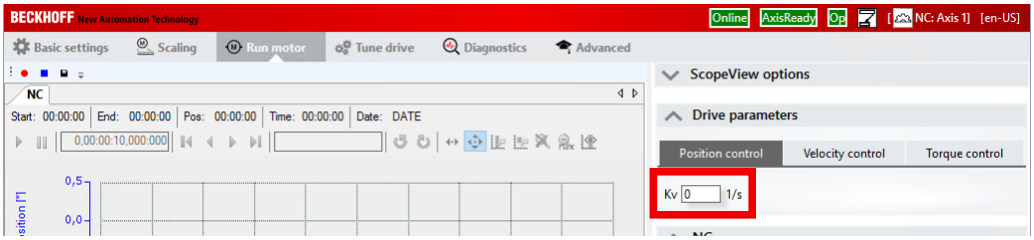
The velocity controller is a PI controller. It is only active if field-oriented control is activated (Commutation type = "Stepper FOC with encoder").

The following parameters are optimized in this chapter:

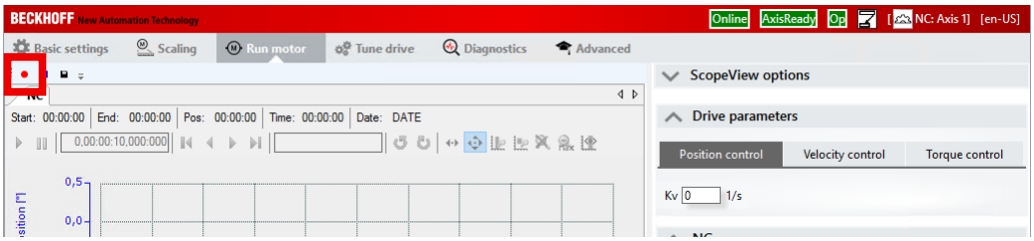
- The integral component Tn
- The proportional component Kp.

Preparation

1. Open the "Run motor" menu
2. Temporarily disable the position controller by setting the value Kv of the position controller to 0.



3. Click the "Start record" button.



⇨ The Scope View records position, velocity and following error.

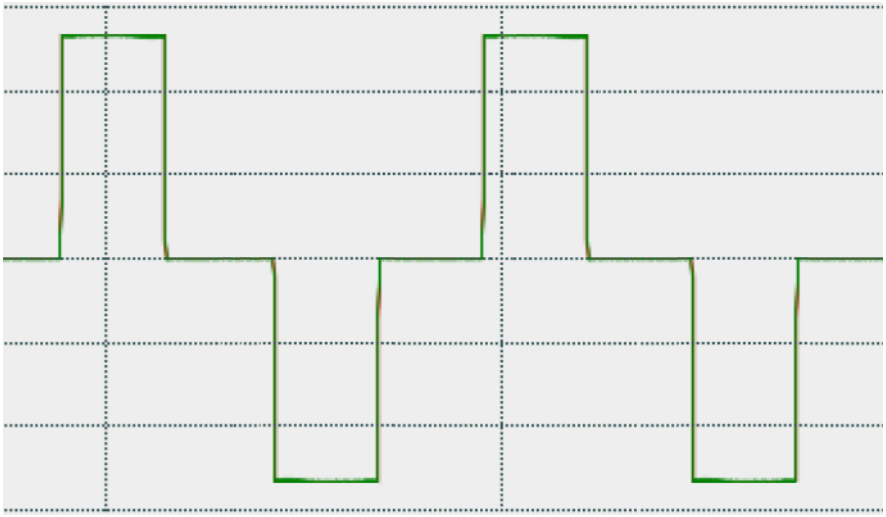
4. Under "NC": select "Functions"
5. In the "Start mode" field, select the "Reversing sequence" entry
6. Enter realistic values in the following fields:
   Target position 1
   Target velocity
   Target position 2
7. Click the "Start" button.
   ⇨ The motor performs the set movement periodically.
8. If necessary, reduce the acceleration time
   See chapter Dynamics.
9. Under "Drive Parameters", select the "Velocity control" tab

⇨ You can set the controller parameters of the velocity controller here.

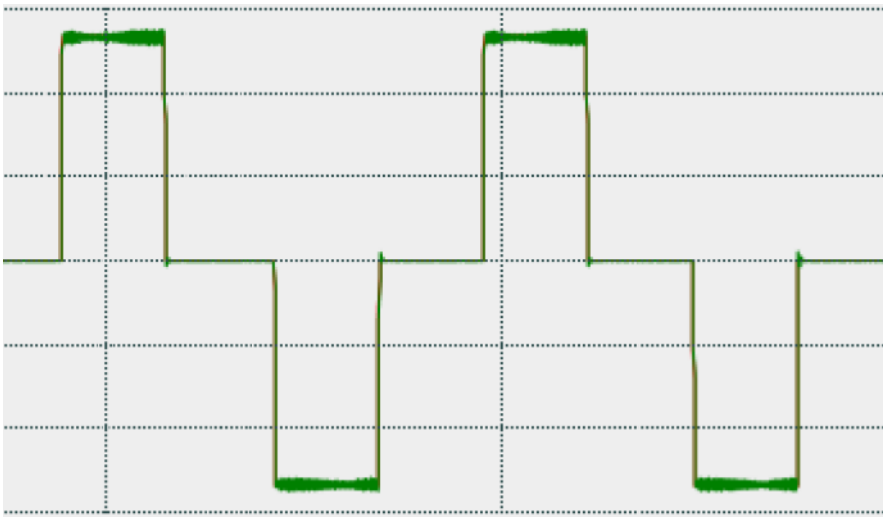
Optimization of the integral component Tn

1. Reduce the Tn value step by step
   Confirm each entry with [Ctrl] + [Enter]
   Meanwhile, observe the Scope View

⇨ At a certain value of Tn, the motor starts to oscillate.
Example without oscillation:



Example with oscillation:



From here on, do not reduce the Tn value any further.

2. Increase Tn again until the motor no longer oscillates
3. Increase Tn a bit more, depending on the application

⇨ The integral component Tn is optimized.

Optimization of the proportional component Kp

The optimization of Kp is analogous to the optimization of Tn. However, you do not have to reduce Kp, but increase it.

1. Increase the Kp value step by step
   Confirm each entry with [Ctrl] + [Enter]
   Meanwhile, observe the Scope View
   ⇨ At a certain value of Tn, the motor starts to oscillate. See above.
2. Reduce Kp again until the motor no longer oscillates
3. Still reduce Kp a little. Depending on the application

6.5.3 Optimization of the position controller

The position controller is a P-controller.

Optimization of the proportional component Kv

The optimization of the proportional component is analogous to the optimization of the proportional component of the velocity controller.

1. Under "Drive Parameters" select the tab "Position"
2. Increase the Kv value step by step
   Meanwhile, watch the Scope View
   ⇨ At a certain value of Kv the motor starts to oscillate
3. Reduce Kv again until the motor no longer oscillates
4. Reduce Kv a bit more
   Depending on the application.

⇨ The position controller is optimized.

Velocity pre-control

The velocity pre-control improves the control behavior especially during acceleration and braking.

It routes part of the position setpoint past the position controller and directly to the velocity controller.

1. Select the menu "Tune Drive"
2. Click on "Position Controller" in the controller structure
3. Set the parameter K in the "Feed forward velocity" field

7 Commissioning

7.1 Restoring the delivery state

To restore the delivery state (factory settings) of CoE objects for EtherCAT devices (“slaves”), the CoE object *Restore default parameters*, SubIndex 001 can be used via EtherCAT master (e.g. TwinCAT) (see Fig. *Selecting the Restore default parameters PDO*).

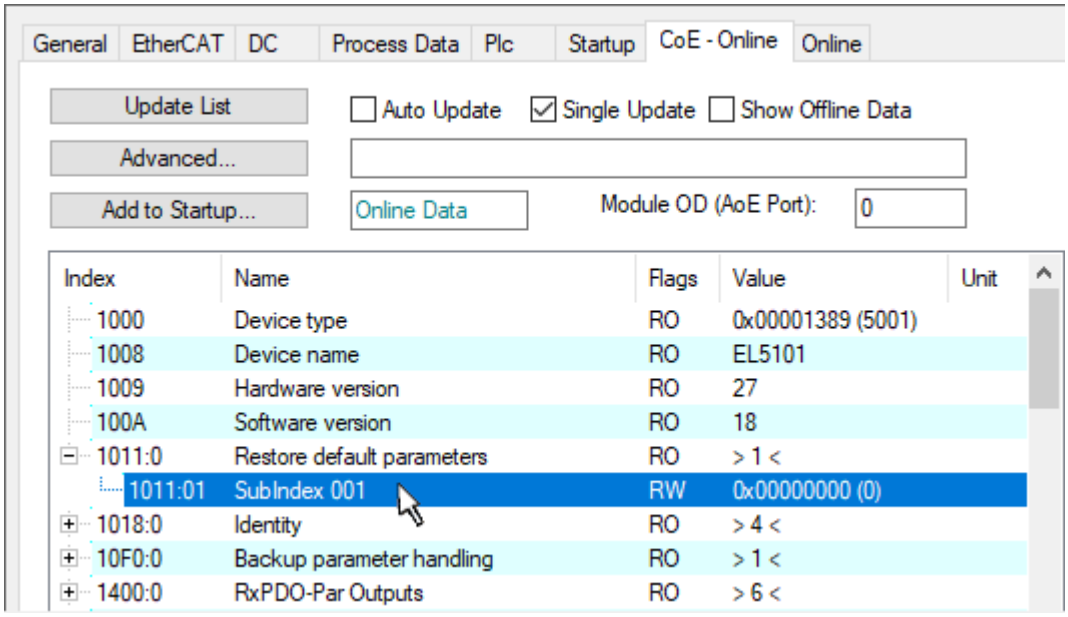


Fig. 6: Selecting the *Restore default parameters* PDO

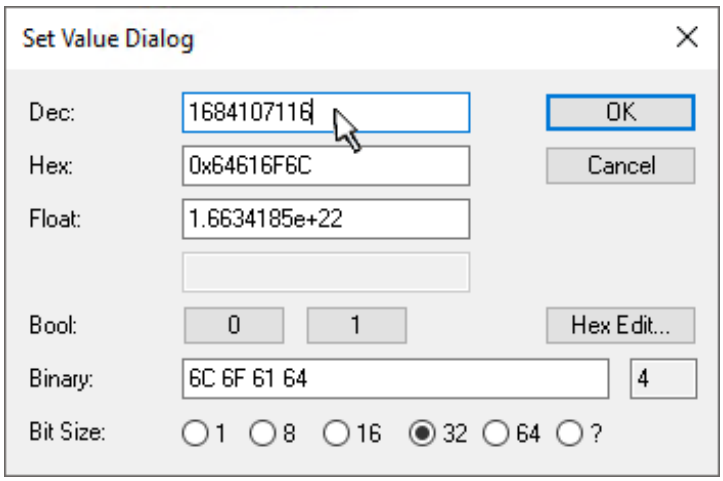


Fig. 7: Entering a restore value in the Set Value dialog

Double-click on *SubIndex 001* to enter the Set Value dialog. Enter the reset value **1684107116** in field *Dec* or the value **0x64616F6C** in field *Hex* (ASCII: “load”) and confirm with *OK* (Fig. *Entering a restore value in the Set Value dialog*).

- All changeable entries in the slave are reset to the default values.
- The values can only be successfully restored if the reset is directly applied to the online CoE, i.e. to the slave. No values can be changed in the offline CoE.
- TwinCAT must be in the RUN or CONFIG/Freerun state for this; that means EtherCAT data exchange takes place. Ensure error-free EtherCAT transmission.
- No separate confirmation takes place due to the reset. A changeable object can be manipulated beforehand for the purposes of checking.

- This reset procedure can also be adopted as the first entry in the startup list of the slave, e.g. in the state transition PREOP->SAFEOP or, as in Fig. *CoE reset as a startup entry*, in SAFEOP->OP.

All backup objects are reset to the delivery state.

Alternative restore value

In some older terminals (FW creation approx. before 2007) the backup objects can be switched with an alternative restore value: Decimal value: 1819238756, Hexadecimal value: 0x6C6F6164.

An incorrect entry for the restore value has no effect.

7.2 Selection of the controller operation mode

By selecting the operation mode, you determine the controlled variable and the controller structure.

The factory setting is the operation mode CSP.
Select the operation mode according to the desired controlled variable:

Controlled variable	Operation mode
Position	"Cyclic synchronous position mode" CSP [▶ 50] [1]
Velocity	"Cyclic synchronous velocity mode" CSV [▶ 52]
Torque	"Cyclic synchronous torque mode" CST [▶ 52]
Torque and commutation angle	"Cyclic synchronous torque mode with commutation angle" CSTCA [▶ 52]

[1] You can also control the position with the CSV operation mode. See chapter CSV [▶ 52]. The control performance is better with CSP, however.

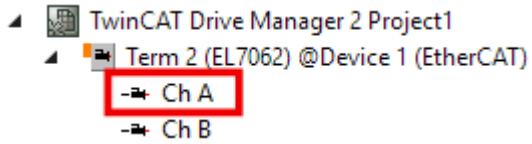
Cycle time

For CSP, CSV, CST, and CSTCA, the cycle time must be n * 62.5 µs (with n = 2 to 160), which is 125 µs to 10 ms.

Setting the operation mode

This section describes how to set the operation mode in the TwinCAT 3 Drive Manager 2.

1. In the Solution Explorer, expand the tree under the "Drive Manager 2 Project".



2. Double click on Ch A.
   ⇨ The Drive Manager 2 opens.
3. Select the menu "Tune drive".
4. Set the operation mode in the drop-down menu "Modes of operation".

⇨ Changes are displayed in the controller structure. E.g. the position controller is disconnected when changing from CSP to CSV.

7.2.1 CSP: Position control

CSP is the abbreviation for "Cyclic synchronous position".

You can specify the target position using the variable "Target position". The target position must be between the values of parameters 8000:1B "Min position range limit" and 8000:1C "Max position range limit".

With the settings for the CSP operation mode, the terminal internally calculates the control loops for current, velocity and position. The NC calculates the setpoint for the position and transfers it to the terminal.

7.2.1.1 Following error monitoring

Following error monitoring is available in CSP operation mode.

Requirements

Following error monitoring only works if an encoder is connected. The parameter 0x8n10:64 "Commutation type" must be set to a value not equal to "Stepper with internal counter".

Enable

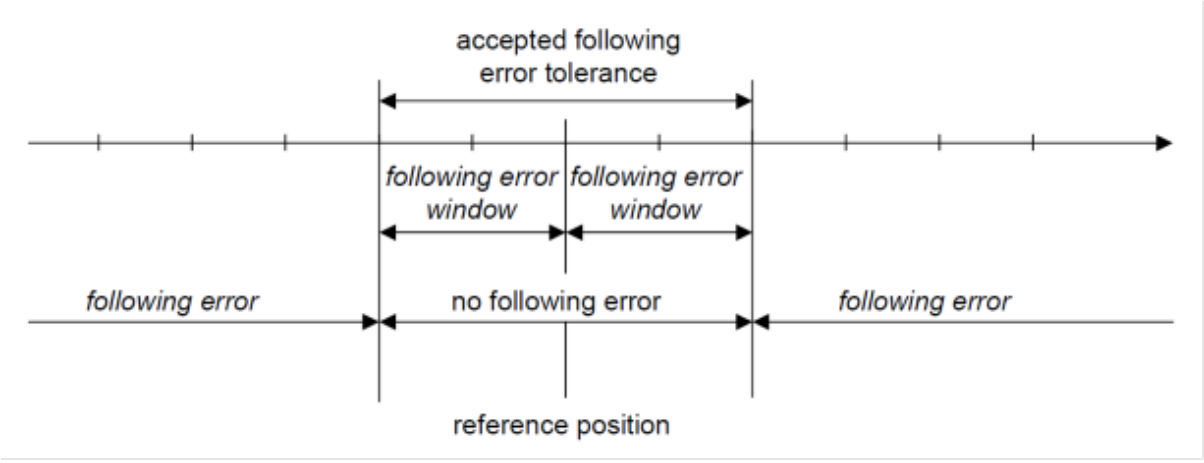
Following error monitoring is disabled in the factory setting.

If the above requirements are met, you can enable following error monitoring by setting the parameter 0x8n10:50 "Following error window" to a value other than the default value 0xFFFF FFFF.

Configure

You can configure the following error monitoring with the following parameters:

- 0x8n10:50 "Following error window" is the amount of the maximum permissible following error in [Inc] (encoder increments). To convert this value into an angle or a distance, you must multiply it by the encoder scaling factor.
  If the following error exceeds the "Following error window", the "Following error time out" starts.

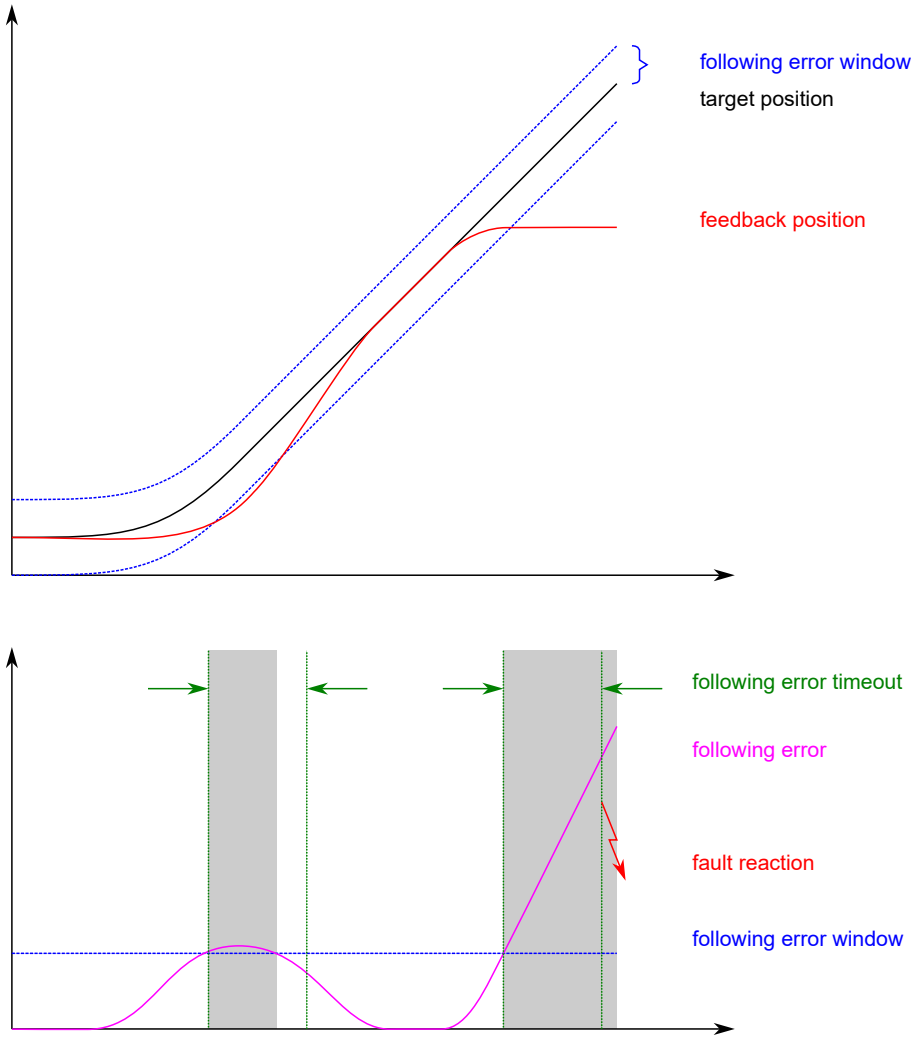


- 0x8n10:51 "Following error time out" is the maximum permissible timespan in milliseconds that the following error may be outside the "Following error window".
  If this timespan is exceeded, the terminal stops the motor and outputs an error.

Monitoring

The variable "Following error actual value" in the process data object "DRV Following error actual value Channel n" contains the current following error.

Example



In this example, the following error exceeds the "Following error window" twice:

- The first time it falls below it again before the "Following error time out" expires.
- The second time, the "Following error time out" is also exceeded, e.g. due to a blocked rotor. The terminal stops the motor and issues an error message.

7.2.2 CSV: Velocity control

CSV is the abbreviation for "Cyclic synchronous velocity".

A defined velocity can be set via the "Target velocity" variable.

Position control with TwinCAT NC

With the CSV operation mode you can also control the position by using TwinCAT NC as the position controller.
In the context of positioning tasks, however, the CSP operation mode performs better as no bus dead times occur between the controllers (due to the communication between terminal and NC) and all controllers in the architecture are calculated in the same place.

7.2.3 CST: Torque control

CST is the abbreviation for "Cyclic synchronous torque".

A defined torque can be set via the "Target torque" variable. You cannot use TwinCAT NC to specify the torque.

7.2.4 CSTCA: Torque control with commutation angle

CSTCA is the abbreviation for "Cyclic synchronous torque with commutation angle".

This operation mode is a current control similar to CST. In addition the user can specify the commutation angle.

You cannot use TwinCAT NC to specify speed and commutation angle. The variable “Commutation angle” can be used to set an angle that is to be maintained with a defined set current of the variable “Target torque”. By specifying a leading angle, a movement can be achieved in this operation mode.

7.3 Scanning the hardware

The EL7062 can scan a connected motor independently. Certain parameters of the motor are determined and saved in the corresponding entries in the CoE.

Different procedure with TwinCAT 2

- See chapter Scanning the hardware with TwinCAT 2 [▶ 54].

7.3.1 Scan Motor

The following parameters are determined during the "Scan Motor" procedure:

- The winding inductance of the motor: parameter 8011:19 "Winding inductance".
- The winding resistance between two phases of the motor: parameter 8011:30 "Winding resistance".
- Initial values for the current controller, velocity controller and position controller.

Executing the scan

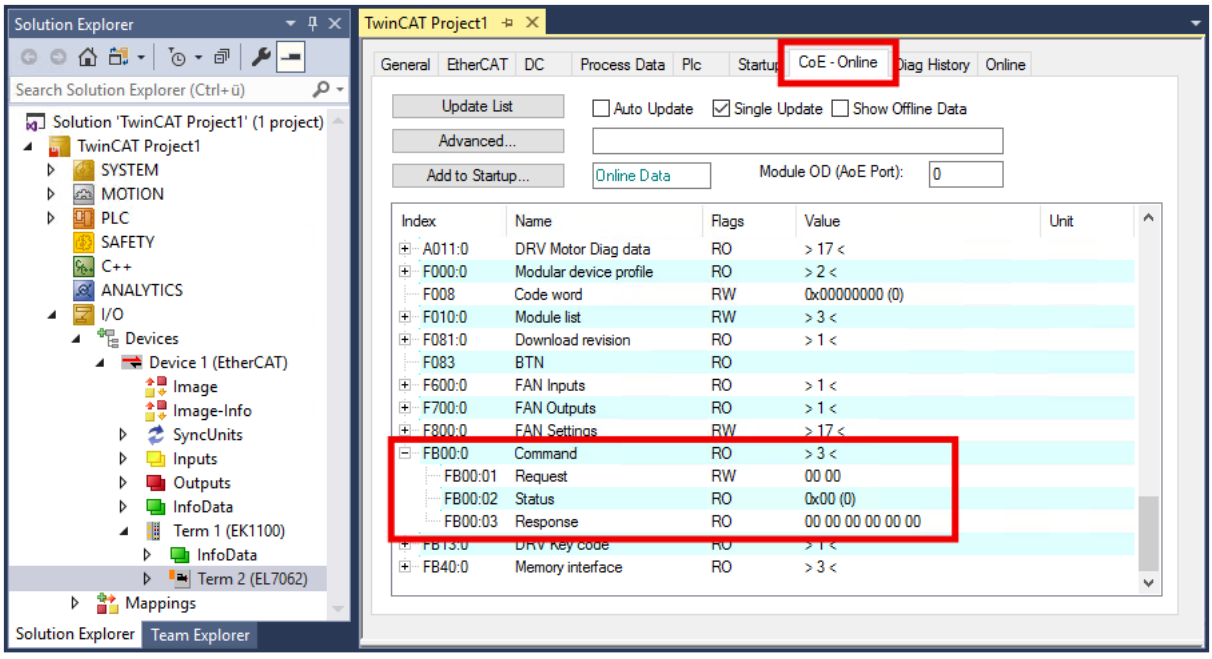
⚠ CAUTION

The motor shaft moves during the scan procedure

Injuries and damage to property are possible.

- Maintain a safe distance to the motor and the moving mechanism.
- Ensure that the motor shaft can move freely.

1. Ensure that all other motor parameters are set correctly, in particular 8n11:12 "Rated current" and 8n11:34 "Configured motor current".
2. For channel 1: Write the command 0x8007 to the register FB00:01 "Request".
   For channel 2: Write the command 0x8017 to the register FB00:01 "Request".



   ⇨ The scan will be executed.

   ⇨ The value of register FB00:02 "Status" indicates the progress of the scan. The values 100_{dec}...199_{dec} correspond to 0...99 %.

3. Wait until register FB00:02 "Status" has one of the following values: 0, 1, 2, 3.

   ⇨ Value 0: the scan has been successfully completed.

   ⇨ Value 3: error. See chapter Error diagnosis [▶ 54].

7.3.2 Error diagnosis

After a scan procedure is completed, an exit code is available on the tab FB00:02 "Status". If the exit code is 3, an error has occurred. Evaluate the tab FB00:03 "Response" using the following table:

Response	Meaning	Comment
xx 00 01 00 00 00	Invalidstartupstate	The axis is enabled. A scan process is only possible if the axis is not enabled.
xx 00 02 00 00 00	Timeout	Timeout during the scan process.
xx 00 03 00 00 00	Driveerror	An error has occurred. Check the Diag History.
xx 00 04 00 00 00	Invalid EtherCAT state	The terminal is not in EtherCAT status OP.

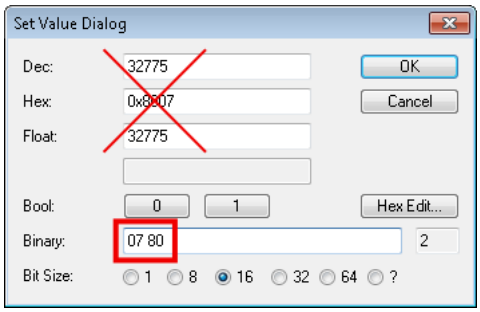
An error does not need to be acknowledged. If a scan was aborted with an error message, you can simply start a new scan.

7.3.3 Scanning the hardware with TwinCAT 2

In TwinCAT 2 a decimal or hexadecimal input of the commands is not possible.

To execute the command "Scan Motor", enter one of the following values in the field "Binary":

- Value “07 80” for channel 1
- Value “17 80” for channel 2



7.4 Commissioning with Drive Motion Control

With Drive Motion Control you can implement a drive motion control without TwinCAT NC.

The TwinCAT NC requires an EtherCAT master that supports Distributed Clocks. A possible use case for Drive Motion Control is therefore the operation of an EL7062 on a controller that does not support Distributed Clocks.

The documentation of the PLC library for Drive Motion Control can be found on the Beckhoff website: Tc3_DriveMotionControl.

7.4.1 Requirements

- TwinCAT 3.1, Build 4024.7 or higher

7.4.2 Functionality

7.4.2.1 Supported functions

Administrative functions

- Axis functions
  - MC_Power
  - MC_Reset
  - MC_SetPosition
- Touch probe
  - MC_AbortTrigger
  - MC_TouchProbe

Motion functions

- Homing
  - MC_Home (Here the bCalibrationCam input of the Tc2_Mc2 library can not be used, but one of the digital inputs of the EL7062 must be used)
- Manual movement
  - MC_Jog
- Point to point movement
  - MC_Halt
  - MC_MoveAbsolute
  - MC_MoveModulo
  - MC_MoveRelative
  - MC_MoveVelocity
  - MC_Stop

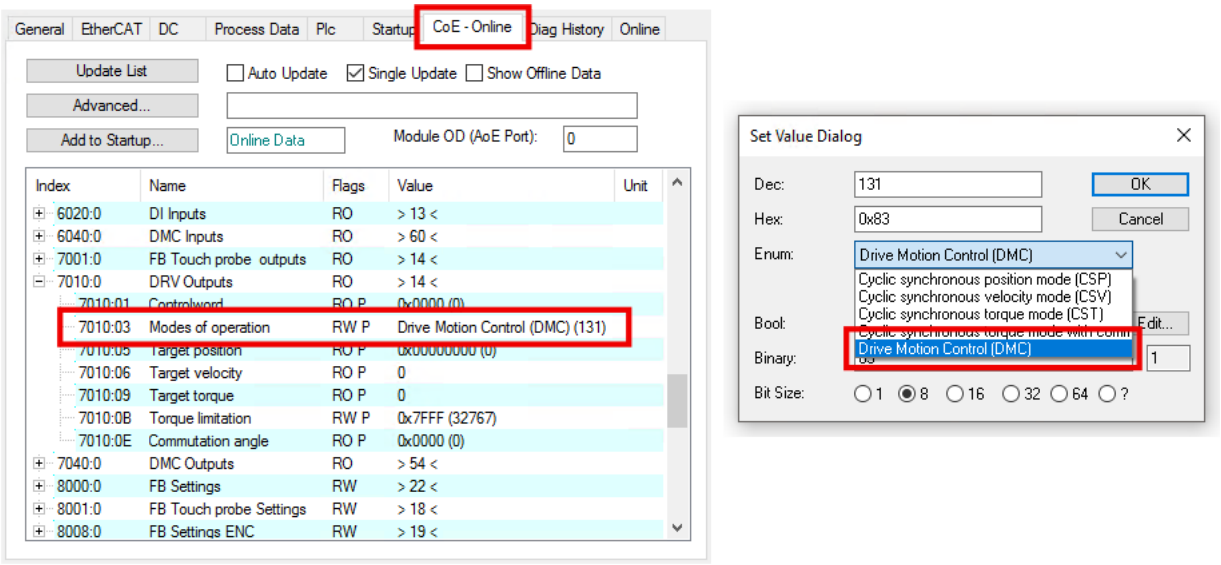
7.4.2.2 Functions that are not supported

All subsequently triggered functions with the aim of changing the target position or speed during an active travel command are not supported (buffer mode).

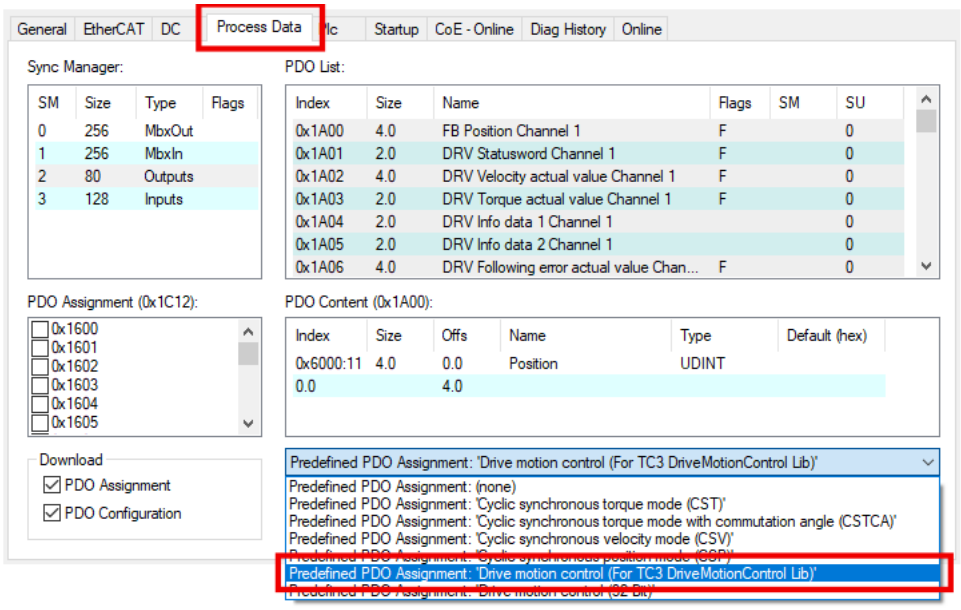
7.4.3 Commissioning in TwinCAT 3

Use the following steps to configure an EL7062 in TwinCAT 3 for operation with Drive Motion Control.

1. Set the operation mode "Drive Motion Control (DMC)" in CoE parameter 0x7010:03 "Modes of operation".



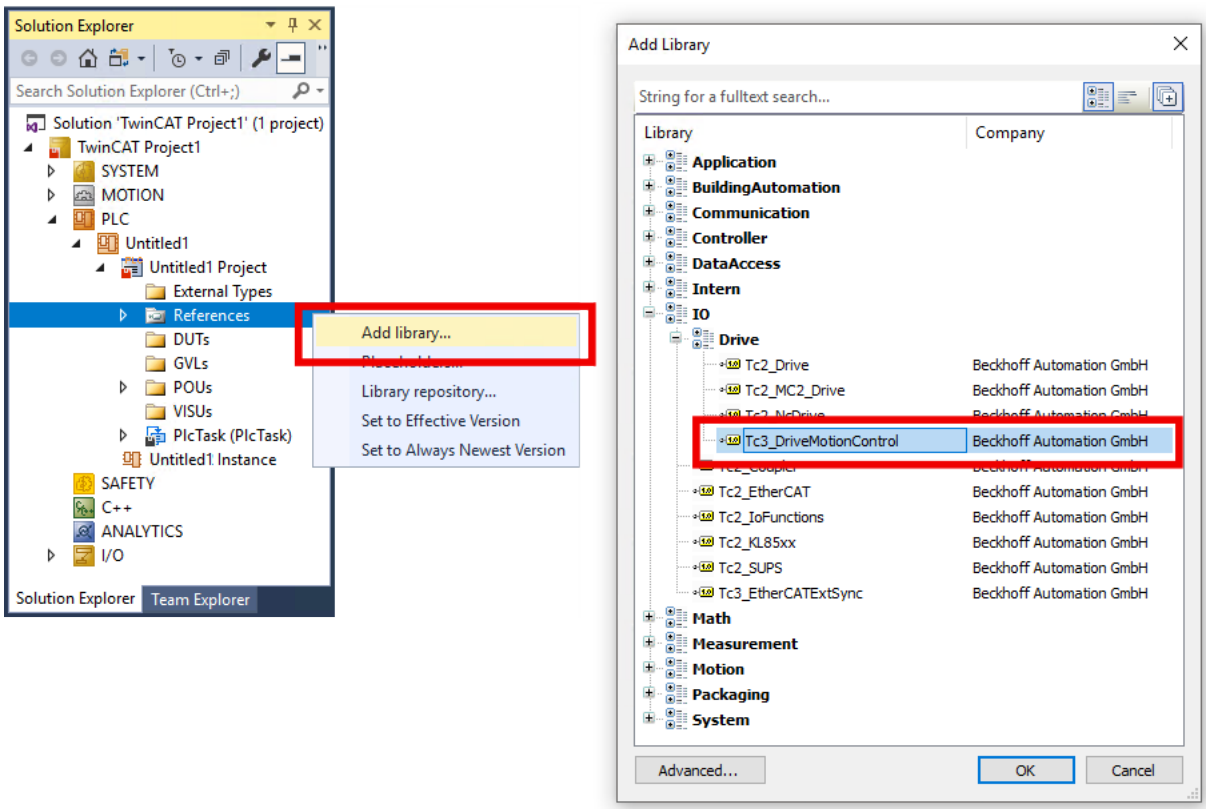
2. Activate the Predefined PDO Assignment "Drive motion control (For TC3 DriveMotionControl Lib)".



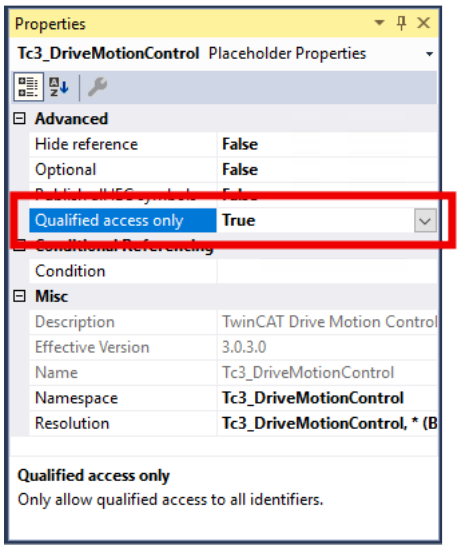
⇨ The process data for using Drive Motion Control is activated.

3. Create a PLC project if none has been created yet.

4. Add the "Tc3_DriveMotionControl" library to the PLC project.
   (If you want to use Drive Motion Control without the "Tc3_DriveMotionControl" library, see chapter State machine [▶ 62].)



5. If the “Tc3_DriveMotionControl” and “Tc2_Mc2” libraries are used simultaneously in the current project: In the “Properties” window, set the “Qualified access only” property of one of the two libraries to “True”.



   ⇨ The library with “Qualified access only” can only be addressed in the PLC code via the corresponding namespace, e.g: `Tc3_DriveMotionControl.MC_Stop()`
   This avoids name conflicts, e.g. when calling the function block `MC_Stop`, which has the same name in both libraries.

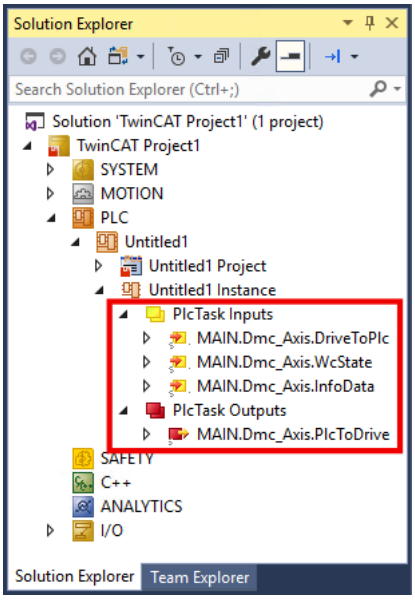
6. Declare a variable of type “AXIS_REF” in the PLC. Sample:

```
VAR
    DmcAxis:    AXIS_REF;
END_VAR
```

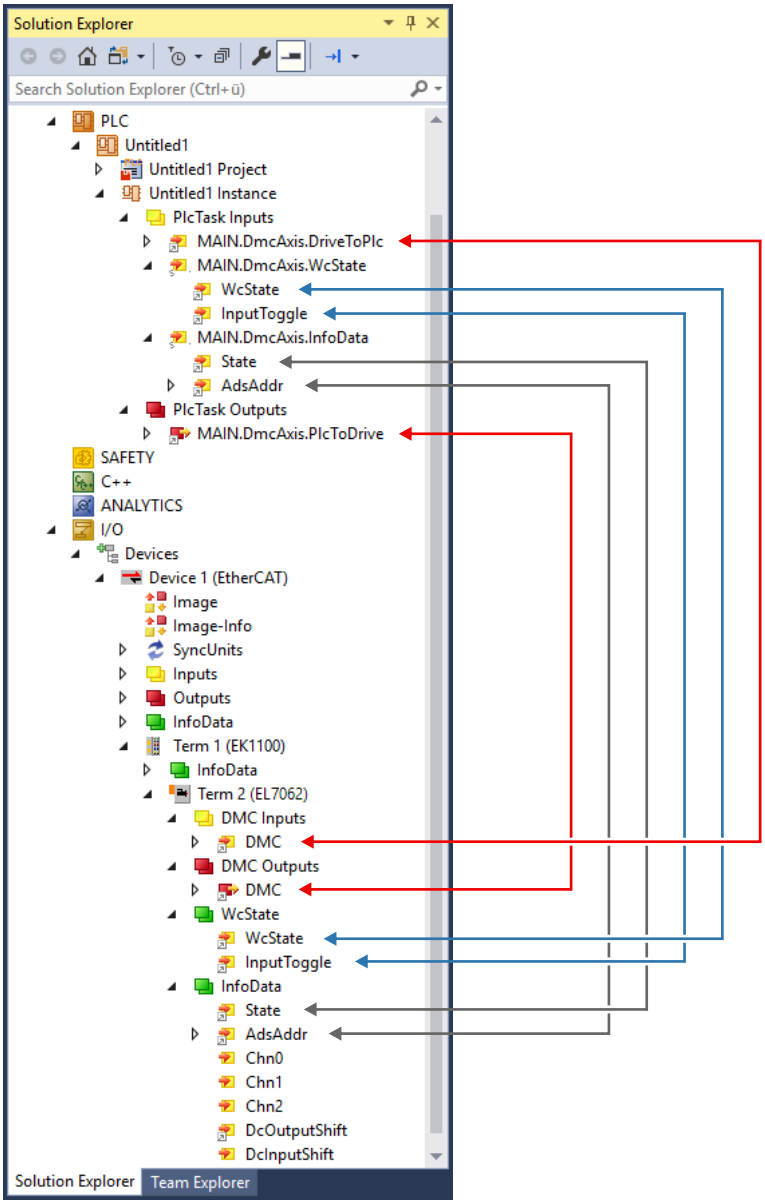
7. Click on “Build” > “Build Solution” in the menu bar.

⇨ The project is compiled.

⇨ The process image of the PLC task is generated.



8. In the Solution Explorer link the PLC variables with the process data of EL7062.



9. In the PLC code, call the function block `ReadStatus()` cyclically, ideally at the beginning of each PLC cycle.

7.4.3.1 Parameter

CoE parameters

The CoE parameters for configuring Drive Motion Control can be found in the following CoE objects:

- 0x8n60 "DMC Settings Ch. n"
- 0x8n61 "DMC Features Ch. n"

Scaling factor and maximum velocity

Position values are defined as 64-bit variables at Drive Motion Control.
The low-order 32 bits resolve the single-turn increments. The possibly lower resolution of the feedback is extrapolated to the full 32 bits.
The higher-order 32 bits represent the multi-turn revolutions.

The feed constant “Feed constant” includes any transmission ratios (gearbox, belt, etc.) and represents the output-side travel per motor revolution.

Therefore, the following exemplary formula without transmission ratio results for the scaling factor:

$$Encoder\ Scaling\ Factor = \frac{Feed\ constant}{32\ Bit} = \frac{360°}{32\ Bit} \approx 8{,}3819031715393066e-8$$

The maximum achievable velocity of the motor depends on the DC link voltage. If lower voltages than specified in the data sheet are used, the nominal speed may have to be adjusted to the voltage. To specify the maximum velocity of the motor in the CoE directory, the parameter 0x8n11:2E “Rated speed” is also used. The nominal speed of the motor is specified here in 1/min. To adjust the speed of the scaling, this value is multiplied by the feed constant and normalized to the unit second. This results in the following formula for the exemplary calculation of the maximum speed:

$$MaxVelocity = \frac{Rated\ speed\ \cdot Feed\ constant}{60\frac{s}{min}} = \frac{1000\frac{U}{min}\cdot 360°}{60\frac{s}{min}} = 6000\frac{°}{s}$$

The following sample shows the implementation in a PLC program:

```
PROGRAM MAIN
VAR
   DmcAxis:   AXIS_REF
END_VAR


// Update the axis structure
DmcAxis.ReadStatus();

// Scaling factor without gear ratio, feed constant 360°
DmcAxis.Parameter.EncoderScalingFactor := 0.00000008381903171539306 6;

// Velocity scaling with 1000 rpm, feed constant 360°
DmcAxis.Parameter.MaxVelocity := 6000;
```

7.4.4 Commissioning with a third-party 32-bit controller

The library “Tc3_DriveMotionControl” cannot be used.

You can only execute travel commands by going through the state machine manually. See chapter State machine [▶ 62].

Since the terminal provides 64-bit process data by default, but this cannot be processed by some controllers, there is also the alternative option of mapping the process image with 32 bits. This can be set via the Predefined PDO Assignment "Drive motion control (32 Bit)".
(To map the inputs and outputs manually, use the indices 0x16E1 and 0x1AE1)

All position related process data are 32-bit instead of 64-bit with this Predefined PDO Assignment. The 32 bits are divided into 20-bit single-turn and 12-bit multi-turn revolutions, independent of the resolution of the feedback.
The terminal still calculates internally with 64-bit data. Therefore, for example, 0x8n60:08 “Calibration Position” must still be specified in 32-bit single-turn and 32-bit multi-turn instead of 20-bit single-turn and 12-bit multi-turn.

All non-position related process data remain unchanged in size. The address offsets of the individual process data are identical and padding bytes are inserted at the corresponding positions.

The speed-related process data is scaled in 10,000ths of the parameter 0x8n11:1B “Motor speed limitation”.

The process data for acceleration and deceleration specify in ms how fast the motor should accelerate to the speed specified in 0x8n11:2E “Rated Speed” or decelerate from speed to standstill. With a value of 2000 for the acceleration, the motor would need 2 s to reach the speed.

Configuration

Example for channel 1:

1. Activate the process data objects 0x16E1 and 0x1AE1.
   In TwinCAT, you can do this by activating Predefined PDO Assignment "Drive motion control (32 Bit)" in the "Process Data" tab.
   ⇨ From firmware 02, the operation mode "Drive Motion Control (DMC)" is automatically set in CoE parameter 0x7010:03.
   If you are using firmware 01, see the following step.
2. *Only necessary with firmware 01:* In CoE parameter 0x7010:03 "Modes of operation" enter the value 0x83 (131_{dec}).
   ⇨ The operation mode "Drive Motion Control (DMC)" is activated.

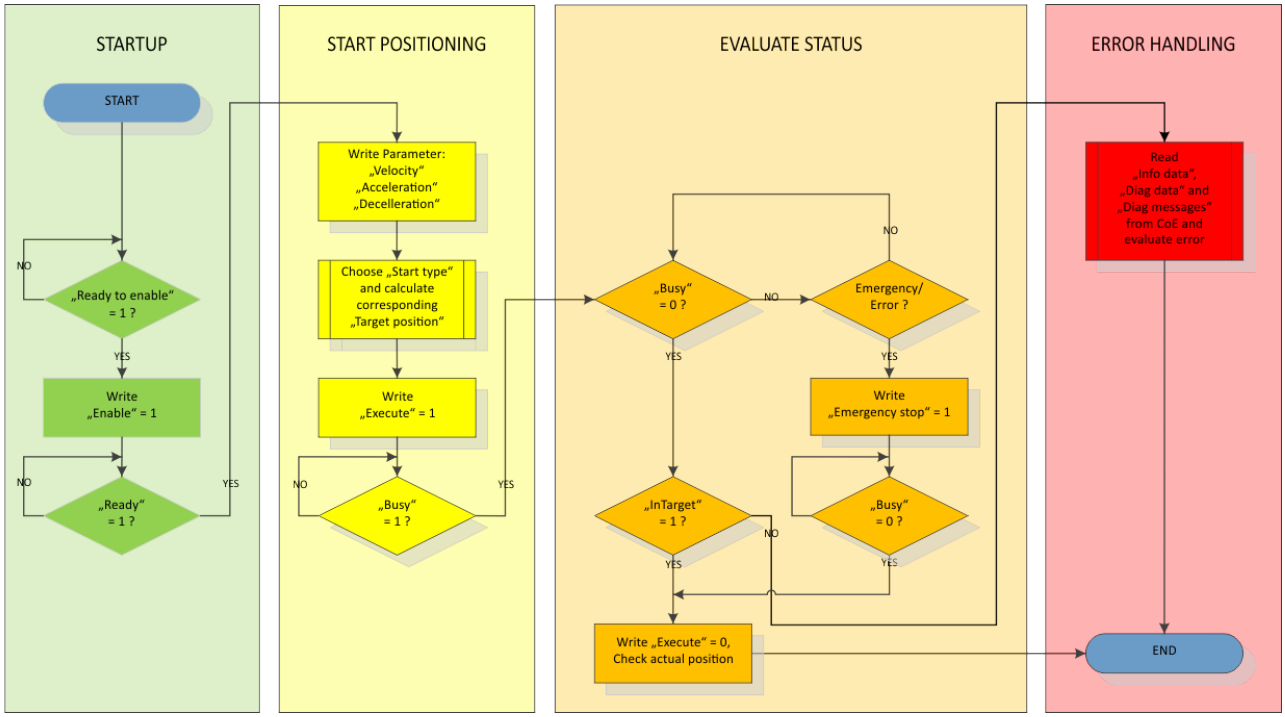
CoE parameters

The CoE parameters for configuring Drive Motion Control can be found in the following CoE objects:

- 0x8n60 "DMC Settings Ch. n"
- 0x8n61 "DMC Features Ch. n"

7.4.5 State machine

It is also possible to start travel commands without the function blocks of the library "Tc3_DriveMotionControl". This is based on the following state machine:



The variables for control and evaluation are located in the process data objects "DMC Inputs" and "DMC Outputs":

- DMC Inputs
  - DMC
    - FeedbackStatus
      - Latch extern valid
      - Set counter done
      - Status of extern latch
    - DriveStatus
      - Ready to enable
      - Ready
      - Warning
      - Error
      - Moving positive
      - Moving negative
      - Digital input 1
      - Digital input 2
    - PositioningStatus
      - Busy
      - In-Target
      - Warning
      - Error
      - Calibrated
      - Accelerate
      - Decelerate
      - Ready to execute
    - Set position
    - Set velocity
    - Actual drive time
    - Actual position lag
    - Actual velocity
    - Actual position
    - Error id
    - Input cycle counter
    - Channel id
    - Latch value
    - Cyclic info data 1
    - Cyclic info data 2

- DMC Outputs
  - DMC
    - FeedbackControl
      - Enable latch extern on positive edge
      - Set counter
      - Enable latch extern on negative edge
    - DriveControl
      - Enable
      - Reset
    - PositioningControl
      - Execute
      - Emergency stop
    - Set counter value
    - Target position
    - Target velocity
    - Start type
    - Target acceleration
    - Target deceleration

7.4.6 Differences compared with Tc2_Mc2

Tc2_Mc2 is the PLC library used for the operation of EL7062 with TwinCAT NC.

The function blocks of the Tc3_DriveMotionControl library have a similar structure to that of Tc2_Mc2. However, Tc3_DriveMotionControl differs from Tc2_Mc2 in the following points:

- It is mandatory to specify values for the accelerations because there are no default values.
- "After-triggering functions" are not supported. Therefore there is no "BufferMode".
- MC_Home has no input "bCalibrationCam". The settings for homing are located in the CoE object 0x8n61 "DMC Features Ch. n".

7.4.7 Start types

Start type	Code	Description
ABSOLUTE	0x0001	Absolute positioning to a specified target position
RELATIVE	0x0002	Relative positioning to a calculated target position; a specified position difference is added to the current position
ENDLESS_PLUS	0x0003	Endless travel in the positive direction of rotation (direct specification of a speed)
ENDLESS_MINUS	0x0004	Endless travel in the negative direction of rotation (direct specification of a speed)
MODULO_SHORT	0x0105	Modulo positioning along the shortest path to the modulo position (positive or negative), calculated by the "Modulo factor"
MODULO_PLUS	0x0205	Modulo positioning in the positive direction of rotation to the calculated modulo position
MODULO_MINUS	0x0305	Modulo positioning in the negative direction of rotation to the calculated modulo position
CALI_PLC_CAM	0x6000	Start a calibration with cam (digital inputs)
CALI_ON_BLOCK	0x6200	Start a calibration "on Block"
CALI_SET_POS	0x6E00	Set as calibrated, do not change the position
CALI_CLEAR_POS	0x6F00	Clear calibration bit

7.4.8 Error messages

Error Code	Message
0x4420	Cogging compensation not supported
0x8450	Invalid Start Type 0x%x, "%x" replaced by the unsupported start type from the PDO
0x8451	Invalid limit switch level
0x8452	Drive error during positioning
0x8453	Latch unit will be used by multiple modules
0x8454	Drive not in control
0x8455	Invalid value for "Target acceleration"
0x8456	Invalid value for "Target deceleration"
0x8457	Invalid value for "Target velocity"
0x8458	Invalid value for "Target position"
0x8459	Emergency stop active
0x845A	Target position exceeds Modulofactor
0x845B	Drive must be disabled
0x845C	No feedback found
0x845D	Modulo factor invalid
0x845E	Invalid target position window

7.5 Diagnostics

7.5.1 Diagnostics - basic principles of diag messages

DiagMessages designates a system for the transmission of messages from the EtherCAT Slave to the EtherCAT Master/TwinCAT. The messages are stored by the device in its own CoE under 0x10F3 and can be read by the application or the System Manager. An error message referenced via a code is output for each event stored in the device (warning, error, status change).

Definition

The *DiagMessages* system is defined in the ETG (EtherCAT Technology Group) in the guideline ETG.1020, chapter 13 “Diagnosis handling”. It is used so that pre-defined or flexible diagnostic messages can be conveyed from the EtherCAT Slave to the Master. In accordance with the ETG, the process can therefore be implemented supplier-independently. Support is optional. The firmware can store up to 250 DiagMessages in its own CoE.

Each DiagMessage consists of

- Diag Code (4-byte)
- Flags (2-byte; info, warning or error)
- Text ID (2-byte; reference to explanatory text from the ESI/XML)
- Timestamp (8-byte, local slave time or 64-bit Distributed Clock time, if available)
- Dynamic parameters added by the firmware

The DiagMessages are explained in text form in the ESI/XML file belonging to the EtherCAT device: on the basis of the Text ID contained in the DiagMessage, the corresponding plain text message can be found in the languages contained in the ESI/XML. In the case of Beckhoff products these are usually German and English.

Via the entry *NewMessagesAvailable* the user receives information that new messages are available.

DiagMessages can be confirmed in the device: the last/latest unconfirmed message can be confirmed by the user.

In the CoE both the control entries and the history itself can be found in the CoE object 0x10F3:

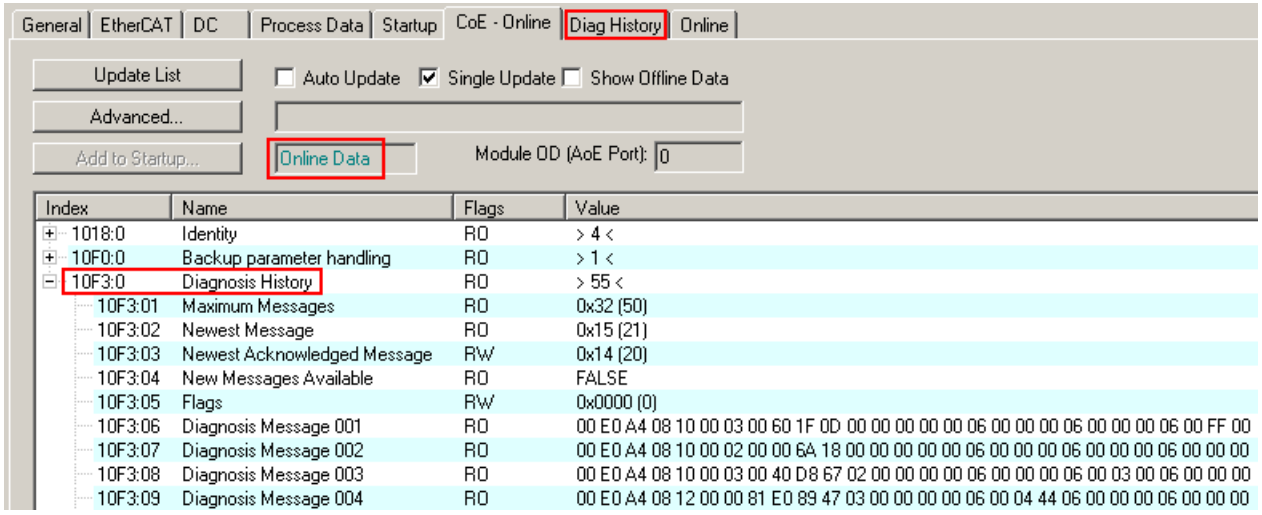


Fig. 8: DiagMessages in the CoE

The subindex of the latest *DiagMessage* can be read under 0x10F3:02.

Support for commissioning

The DiagMessages system is to be used above all during the commissioning of the plant. The diagnostic values e.g. in the StatusWord of the device (if available) are helpful for online diagnosis during the subsequent continuous operation.

TwinCAT System Manager implementation

From TwinCAT 2.11 DiagMessages, if available, are displayed in the device's own interface. Operation (collection, confirmation) also takes place via this interface.

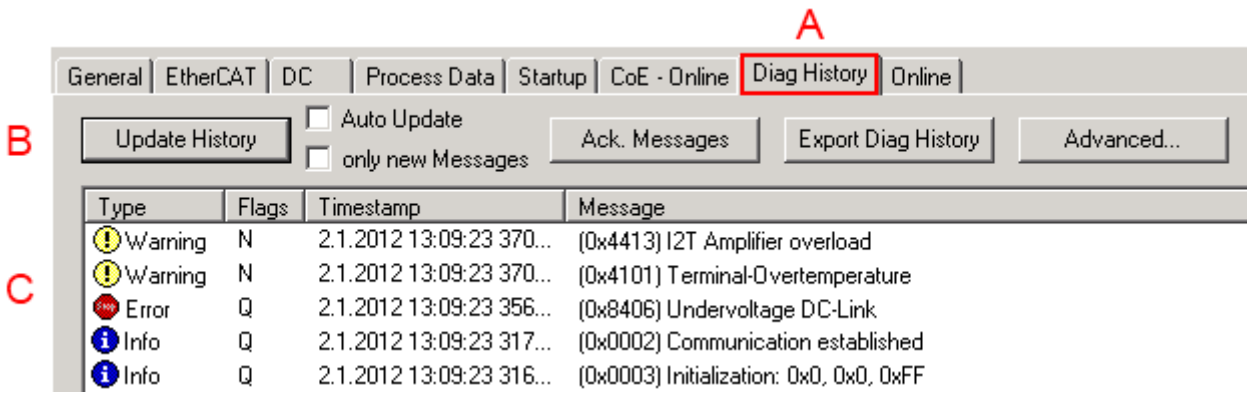


Fig. 9: Implementation of the DiagMessage system in the TwinCAT System Manager

The operating buttons (B) and the history read out (C) can be seen on the Diag History tab (A). The components of the message:

- Info/Warning/Error
- Acknowledge flag (N = unconfirmed, Q = confirmed)
- Time stamp
- Text ID
- Plain text message according to ESI/XML data

The meanings of the buttons are self-explanatory.

DiagMessages within the ADS Logger/Eventlogger

From TwinCAT 3.1 build 4022 onwards, DiagMessages sent by the terminal are shown by the TwinCAT ADS Logger. Given that DiagMessages are represented IO- comprehensive at one place, commissioning will be simplified. In addition, the logger output could be stored into a data file – hence DiagMessages are available long-term for analysis.

DiagMessages are actually only available locally in CoE 0x10F3 in the terminal and can be read out manually if required, e.g. via the DiagHistory mentioned above.

In the latest developments, the EtherCAT Terminals are set by default to report the presence of a DiagMessage as emergency via EtherCAT; the event logger can then retrieve the DiagMessage. The function is activated in the terminal via 0x10F3:05, so such terminals have the following entry in the StartUp list by default:

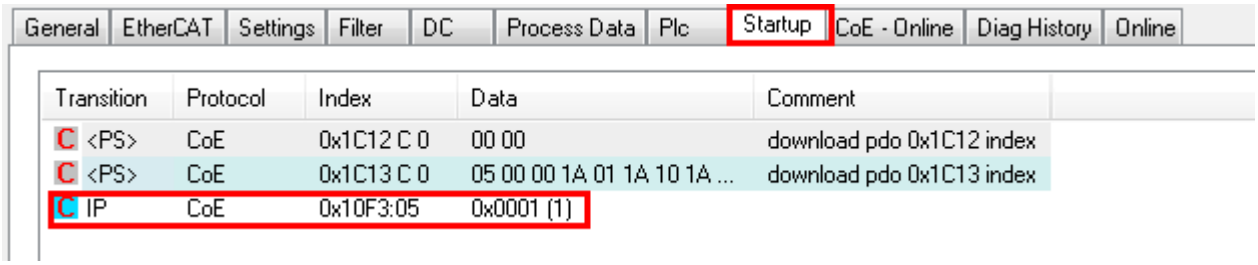


Fig. 10: Startup List

If the function is to be deactivated because, for example, many messages come in or the EventLogger is not used, the StartUp entry can be deleted or set to 0. The value can then be set back to 1 later from the PLC via CoE access if required.

Reading messages into the PLC

- In preparation -

Interpretation

Time stamp

The time stamp is obtained from the local clock of the terminal at the time of the event. The time is usually the distributed clock time (DC) from register x910.

Please note: When EtherCAT is started, the DC time in the reference clock is set to the same time as the local IPC/TwinCAT time. From this moment the DC time may differ from the IPC time, since the IPC time is not adjusted. Significant time differences may develop after several weeks of operation without a EtherCAT restart. As a remedy, external synchronization of the DC time can be used, or a manual correction calculation can be applied, as required: The current DC time can be determined via the EtherCAT master or from register x901 of the DC slave.

Structure of the Text ID

The structure of the MessageID is not subject to any standardization and can be supplier-specifically defined. In the case of Beckhoff EtherCAT devices (EL, EP) it usually reads according to **xyzz**:

x	y	zz
0: Systeminfo 2: reserved 1: Info 4: Warning 8: Error	0: System 1: General 2: Communication 3: Encoder 4: Drive 5: Inputs 6: I/O general 7: reserved	Error number

Example: Message 0x4413 --> Drive Warning Number 0x13

Overview of text IDs

Specific text IDs are listed in the device documentation.

Text ID	Type	Place	Text Message	Additional comment
0x0001	Information	System	No error	No error
0x0002	Information	System	Communication established	Connection established
0x0003	Information	System	Initialization: 0x%X, 0x%X, 0x%X	General information; parameters depend on event. See device documentation for interpretation.
0x1000	Information	System	Information: 0x%X, 0x%X, 0x%X	General information; parameters depend on event. See device documentation for interpretation.
0x1012	Information	System	EtherCAT state change Init - PreOp	
0x1021	Information	System	EtherCAT state change PreOp - Init	
0x1024	Information	System	EtherCAT state change PreOp - Safe-Op	
0x1042	Information	System	EtherCAT state change SafeOp - PreOp	
0x1048	Information	System	EtherCAT state change SafeOp - Op	
0x1084	Information	System	EtherCAT state change Op - SafeOp	
0x1100	Information	General	Detection of operation mode completed: 0x%X, %d	Detection of the mode of operation ended
0x1135	Information	General	Cycle time o.k.: %d	Cycle time OK
0x1157	Information	General	Data manually saved (Idx: 0x%X, SubIdx: 0x%X)	Data saved manually
0x1158	Information	General	Data automatically saved (Idx: 0x%X, SubIdx: 0x%X)	Data saved automatically
0x1159	Information	General	Data deleted (Idx: 0x%X, SubIdx: 0x%X)	Data deleted
0x117F	Information	General	Information: 0x%X, 0x%X, 0x%X	Information
0x1201	Information	Communication	Communication re-established	Communication to the field side restored This message appears, for example, if the voltage was removed from the power contacts and re-applied during operation.
0x1300	Information	Encoder	Position set: %d, %d	Position set - StartInputhandler
0x1303	Information	Encoder	Encoder Supply ok	Encoder power supply unit OK
0x1304	Information	Encoder	Encoder initialization successfully, channel: %X	Encoder initialization successfully completed
0x1305	Information	Encoder	Sent command encoder reset, channel: %X	Send encoder reset command
0x1400	Information	Drive	Drive is calibrated: %d, %d	Drive is calibrated
0x1401	Information	Drive	Actual drive state: 0x%X, %d	Current drive status
0x1705	Information		CPU usage returns in normal range (< 85%%)	Processor load is back in the normal range
0x1706	Information		Channel is not in saturation anymore	Channel is no longer in saturation
0x1707	Information		Channel is not in overload anymore	Channel is no longer overloaded
0x170A	Information		No channel range error anymore	A measuring range error is no longer active
0x170C	Information		Calibration data saved	Calibration data were saved
0x170D	Information		Calibration data will be applied and saved after sending the command “0x5AFE”	Calibration data are not applied and saved until the command "0x5AFE" is sent.

Text ID	Type	Place	Text Message	Additional comment
0x2000	Information	System	%s: %s	
0x2001	Information	System	%s: Network link lost	Network connection lost
0x2002	Information	System	%s: Network link detected	Network connection found
0x2003	Information	System	%s: no valid IP Configuration - Dhcp client started	Invalid IP configuration
0x2004	Information	System	%s: valid IP Configuration (IP: %d.%d.%d.%d) assigned by Dhcp server %d.%d.%d.%d	Valid IP configuration, assigned by the DHCP server
0x2005	Information	System	%s: Dhcp client timed out	DHCP client timeout
0x2006	Information	System	%s: Duplicate IP Address detected (%d.%d.%d.%d)	Duplicate IP address found
0x2007	Information	System	%s: UDP handler initialized	UDP handler initialized
0x2008	Information	System	%s: TCP handler initialized	TCP handler initialized
0x2009	Information	System	%s: No more free TCP sockets available	No free TCP sockets available.

Text ID	Type	Place	Text Message	Additional comment
0x4000	Warning		Warning: 0x%X, 0x%X, 0x%X	General warning; parameters depend on event. See device documentation for interpretation.
0x4001	Warning	System	Warning: 0x%X, 0x%X, 0x%X	
0x4002	Warning	System	%s: %s Connection Open (IN:%d OUT:%d API:%dms) from %d.%d.%d.%d successful	
0x4003	Warning	System	%s: %s Connection Close (IN:%d OUT:%d) from %d.%d.%d.%d successful	
0x4004	Warning	System	%s: %s Connection (IN:%d OUT:%d) with %d.%d.%d.%d timed out	
0x4005	Warning	System	%s: %s Connection Open (IN:%d OUT:%d) from %d.%d.%d.%d denied (Error: %u)	
0x4006	Warning	System	%s: %s Connection Open (IN:%d OUT:%d) from %d.%d.%d.%d denied (Input Data Size expected: %d Byte(s) received: %d Byte(s))	
0x4007	Warning	System	%s: %s Connection Open (IN:%d OUT:%d) from %d.%d.%d.%d denied (Output Data Size expected: %d Byte(s) received: %d Byte(s))	
0x4008	Warning	System	%s: %s Connection Open (IN:%d OUT:%d) from %d.%d.%d.%d denied (RPI:%dms not supported -> API:%dms)	
0x4101	Warning	General	Terminal-Overtemperature	Overtemperature. The internal temperature of the terminal exceeds the parameterized warning threshold.
0x4102	Warning	General	Discrepancy in the PDO-Configuration	The selected PDOs do not match the set operating mode. Sample: Drive operates in velocity mode, but the velocity PDO is but not mapped in the PDOs.
0x417F	Warning	General	Warning: 0x%X, 0x%X, 0x%X	
0x428D	Warning	General	Challenge is not Random	
0x4300	Warning	Encoder	Subincrements deactivated: %d, %d	Sub-increments deactivated (despite activated configuration)
0x4301	Warning	Encoder	Encoder-Warning	General encoder error
0x4302	Warning	Encoder	Maximum frequency of the input signal is nearly reached (channel %d)	
0x4303	Warning	Encoder	Limit counter value was reduced because of the PDO configuration (channel %d)	
0x4304	Warning	Encoder	Reset counter value was reduced because of the PDO configuration (channel %d)	
0x4400	Warning	Drive	Drive is not calibrated: %d, %d	Drive is not calibrated
0x4401	Warning	Drive	Starttype not supported: 0x%X, %d	Start type is not supported
0x4402	Warning	Drive	Command rejected: %d, %d	Command rejected
0x4405	Warning	Drive	Invalid modulo subtype: %d, %d	Modulo sub-type invalid
0x4410	Warning	Drive	Target overrun: %d, %d	Target position exceeded
0x4411	Warning	Drive	DC-Link undervoltage (Warning)	The DC link voltage of the terminal is lower than the parameterized minimum voltage. Activation of the output stage is prevented.
0x4412	Warning	Drive	DC-Link overvoltage (Warning)	The DC link voltage of the terminal is higher than the parameterized maximum voltage. Activation of the output stage is prevented.
0x4413	Warning	Drive	I2T-Model Amplifier overload (Warning)	• The amplifier is being operated outside the specification. • The I2T-model of the amplifier is incorrectly parameterized.
0x4414	Warning	Drive	I2T-Model Motor overload (Warning)	• The motor is being operated outside the parameterized rated values.

Text ID	Type	Place	Text Message	Additional comment
				• The I2T-model of the motor is incorrectly parameterized.
0x4415	Warning	Drive	Speed limitation active	The maximum speed is limited by the parameterized objects (e.g. velocity limitation, motor speed limitation). This warning is output if the set velocity is higher than one of the parameterized limits.
0x4416	Warning	Drive	Step lost detected at position: 0x%X%X	Step loss detected
0x4417	Warning	Drive	Motor overtemperature	The internal temperature of the motor exceeds the parameterized warning threshold
0x4418	Warning	Drive	Limit: Current	Limit: current is limited
0x4419	Warning	Drive	Limit: Amplifier I2T-model exceeds 100%%	The threshold values for the maximum current were exceeded.
0x441A	Warning	Drive	Limit: Motor I2T-model exceeds 100%%	Limit: Motor I2T-model exceeds 100%
0x441B	Warning	Drive	Limit: Velocity limitation	The threshold values for the maximum speed were exceeded.
0x441C	Warning	Drive	STO while the axis was enabled	An attempt was made to activate the axis, despite the fact that no voltage is present at the STO input.
0x4600	Warning	General IO	Wrong supply voltage range	Supply voltage not in the correct range
0x4610	Warning	General IO	Wrong output voltage range	Output voltage not in the correct range
0x4705	Warning		Processor usage at %d %%	Processor load at %d %%
0x470A	Warning		EtherCAT Frame missed (change Settings or DC Operation Mode or Sync0 Shift Time)	EtherCAT frame missed (change DC Operation Mode or Sync0 Shift Time under Settings)

Text ID	Type	Place	Text Message	Additional comment
0x8000	Error	System	%s: %s	
0x8001	Error	System	Error: 0x%X, 0x%X, 0x%X	General error; parameters depend on event. See device documentation for interpretation.
0x8002	Error	System	Communication aborted	Communication aborted
0x8003	Error	System	Configuration error: 0x%X, 0x%X, 0x%X	General; parameters depend on event. See device documentation for interpretation.
0x8004	Error	System	%s: Unsuccessful FwdOpen-Response received from %d.%d.%d.%d (%s) (Error: %u)	
0x8005	Error	System	%s: FwdClose-Request sent to %d.%d.%d.%d (%s)	
0x8006	Error	System	%s: Unsuccessful FwdClose-Response received from %d.%d.%d.%d (%s) (Error: %u)	
0x8007	Error	System	%s: Connection with %d.%d.%d.%d (%s) closed	
0x8100	Error	General	Status word set: 0x%X, %d	Error bit set in the status word
0x8101	Error	General	Operation mode incompatible to PDO interface: 0x%X, %d	Mode of operation incompatible with the PDO interface
0x8102	Error	General	Invalid combination of Inputs and Outputs PDOs	Invalid combination of input and output PDOs
0x8103	Error	General	No variable linkage	No variables linked
0x8104	Error	General	Terminal-Overtemperature	The internal temperature of the terminal exceeds the parameterized error threshold. Activation of the terminal is prevented
0x8105	Error	General	PD-Watchdog	Communication between the fieldbus and the output stage is secured by a Watchdog. The axis is stopped automatically if the fieldbus communication is interrupted. • The EtherCAT connection was interrupted during operation. • The Master was switched to Config mode during operation.
0x8135	Error	General	Cycle time has to be a multiple of 125 µs	The IO or NC cycle time divided by 125 µs does not produce a whole number.
0x8136	Error	General	Configuration error: invalid sampling rate	Configuration error: Invalid sampling rate
0x8137	Error	General	Electronic type plate: CRC error	Content of the external name plate memory invalid.
0x8140	Error	General	Sync Error	Real-time violation
0x8141	Error	General	Sync%X Interrupt lost	Sync%X Interrupt lost
0x8142	Error	General	Sync Interrupt asynchronous	Sync Interrupt asynchronous
0x8143	Error	General	Jitter too big	Jitter limit violation
0x817F	Error	General	Error: 0x%X, 0x%X, 0x%X	
0x8200	Error	Communication	Write access error: %d, %d	Error while writing
0x8201	Error	Communication	No communication to field-side (Auxiliary voltage missing)	• There is no voltage applied to the power contacts. • A firmware update has failed.
0x8281	Error	Communication	Ownership failed: %X	
0x8282	Error	Communication	To many Keys founded	
0x8283	Error	Communication	Key Creation failed: %X	
0x8284	Error	Communication	Key loading failed	
0x8285	Error	Communication	Reading Public Key failed: %X	
0x8286	Error	Communication	Reading Public EK failed: %X	
0x8287	Error	Communication	Reading PCR Value failed: %X	
0x8288	Error	Communication	Reading Certificate EK failed: %X	
0x8289	Error	Communication	Challenge could not be hashed: %X	
0x828A	Error	Communication	Tickstamp Process failed	
0x828B	Error	Communication	PCR Process failed: %X	
0x828C	Error	Communication	Quote Process failed: %X	
0x82FF	Error	Communication	Bootmode not activated	Boot mode not activated
0x8300	Error	Encoder	Set position error: 0x%X, %d	Error while setting the position

Text ID	Type	Place	Text Message	Additional comment
0x8301	Error	Encoder	Encoder increments not configured: 0x%X, %d	Encoder increments not configured
0x8302	Error	Encoder	Encoder error	The amplitude of the resolver is too small
0x8303	Error	Encoder	Encoder power missing (channel %d)	
0x8304	Error	Encoder	Encoder communication error, channel: %X	Encoder communication error
0x8305	Error	Encoder	EnDat2.2 is not supported, channel: %X	EnDat2.2 is not supported
0x8306	Error	Encoder	Delay time, tolerance limit exceeded, 0x%X, channel: %X	Runtime measurement, tolerance exceeded
0x8307	Error	Encoder	Delay time, maximum value exceeded, 0x%X, channel: %X	Runtime measurement, maximum value exceeded
0x8308	Error	Encoder	Unsupported ordering designation, 0x%X, channel: %X (only 02 and 22 is supported)	Wrong EnDat order ID
0x8309	Error	Encoder	Encoder CRC error, channel: %X	Encoder CRC error
0x830A	Error	Encoder	Temperature %X could not be read, channel: %X	Temperature cannot be read
0x830C	Error	Encoder	Encoder Single-Cycle-Data Error, channel. %X	CRC error detected. Check the transmission path and the CRC polynomial
0x830D	Error	Encoder	Encoder Watchdog Error, channel. %X	The sensor has not responded within a predefined time period
0x8310	Error	Encoder	Initialisation error	
0x8311	Error	Encoder	Maximum frequency of the input signal is exceeded (channel %d)	
0x8312	Error	Encoder	Encoder plausibility error (channel %d)	
0x8313	Error	Encoder	Configuration error (channel %d)	
0x8314	Error	Encoder	Synchronisation error	
0x8315	Error	Encoder	Error status input (channel %d)	
0x8400	Error	Drive	Incorrect drive configuration: 0x%X, %d	Drive incorrectly configured
0x8401	Error	Drive	Limiting of calibration velocity: %d, %d	Limitation of the calibration velocity
0x8402	Error	Drive	Emergency stop activated: 0x%X, %d	Emergency stop activated
0x8403	Error	Drive	ADC Error	Error during current measurement in the ADC
0x8404	Error	Drive	Overcurrent	Overcurrent in phase U, V or W
0x8405	Error	Drive	Invalid modulo position: %d	Modulo position invalid
0x8406	Error	Drive	DC-Link undervoltage (Error)	The DC link voltage of the terminal is lower than the parameterized minimum voltage. Activation of the output stage is prevented.
0x8407	Error	Drive	DC-Link overvoltage (Error)	The DC link voltage of the terminal is higher than the parameterized maximum voltage. Activation of the output stage is prevented.
0x8408	Error	Drive	I2T-Model Amplifier overload (Error)	• The amplifier is being operated outside the specification. • The I2T-model of the amplifier is incorrectly parameterized.
0x8409	Error	Drive	I2T-Model motor overload (Error)	• The motor is being operated outside the parameterized rated values. • The I2T-model of the motor is incorrectly parameterized.
0x840A	Error	Drive	Overall current threshold exceeded	Total current exceeded
0x8415	Error	Drive	Invalid modulo factor: %d	Modulo factor invalid
0x8416	Error	Drive	Motor overtemperature	The internal temperature of the motor exceeds the parameterized error threshold. The motor stops immediately. Activation of the output stage is prevented.
0x8417	Error	Drive	Maximum rotating field velocity exceeded	Rotary field speed exceeds the value specified for dual use (EU 1382/2014).
0x841C	Error	Drive	STO while the axis was enabled	An attempt was made to activate the axis, despite the fact that no voltage is present at the STO input.

Text ID	Type	Place	Text Message	Additional comment
0x8550	Error	Inputs	Zero crossing phase %X missing	Zero crossing phase %X missing
0x8551	Error	Inputs	Phase sequence Error	Wrong direction of rotation
0x8552	Error	Inputs	Overcurrent phase %X	Overcurrent phase %X
0x8553	Error	Inputs	Overcurrent neutral wire	Overcurrent neutral wire
0x8581	Error	Inputs	Wire broken Ch %D	Wire broken Ch %d
0x8600	Error	General IO	Wrong supply voltage range	Supply voltage not in the correct range
0x8601	Error	General IO	Supply voltage to low	Supply voltage too low
0x8602	Error	General IO	Supply voltage to high	Supply voltage too high
0x8603	Error	General IO	Over current of supply voltage	Overcurrent of supply voltage
0x8610	Error	General IO	Wrong output voltage range	Output voltage not in the correct range
0x8611	Error	General IO	Output voltage to low	Output voltage too low
0x8612	Error	General IO	Output voltage to high	Output voltage too high
0x8613	Error	General IO	Over current of output voltage	Overcurrent of output voltage
0x8700	Error		Channel/Interface not calibrated	Channel/interface not synchronized
0x8701	Error		Operating time was manipulated	Operating time was manipulated
0x8702	Error		Oversampling setting is not possible	Oversampling setting not possible
0x8703	Error		No slave controller found	No slave controller found
0x8704	Error		Slave controller is not in Bootstrap	Slave controller is not in bootstrap
0x8705	Error		Processor usage to high (>= 100%%)	Processor load too high (>= 100%%)
0x8706	Error		Channel in saturation	Channel in saturation
0x8707	Error		Channel overload	Channel overload
0x8708	Error		Overloadtime was manipulated	Overload time was manipulated
0x8709	Error		Saturationtime was manipulated	Saturation time was manipulated
0x870A	Error		Channel range error	Measuring range error for the channel
0x870B	Error		no ADC clock	No ADC clock available
0xFFFF	Information		Debug: 0x%X, 0x%X, 0x%X	Debug: 0x%X, 0x%X, 0x%X

7.5.2 Notes on Diag Messages associated with Motor Terminals

„Ack. Message“ Button

The ‚Ack. Message’ button has no effect on the Drive State Machine of the Motor terminals, pressing the button does not make an axis reset.
The Drive State Machine has no influence on the error list, an axis reset also does not remove any entries from the error list, however, this can be done by pressing the ‚Ack. Message’ button.

8 Advanced device information

8.1 CoE parameters

8.1.1 Objects for parameterization

Index 8000 FB Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8000:0	FB Settings Ch.1		UINT8	RO	0x1C (28_{dec})
8000:11	Device type		UINT32	RW	0x00000005 (5_{dec})
8000:12	Singleturn bits	Number of single-turn bits in the position display (process data, CoE). The sum of the single-turn bits and multi-turn bits must be 32. Note: This parameter only influences the display and is independent of the physical resolution of the position sensor.	UINT8	RW	0x14 (20_{dec})
8000:13	Multiturn bits	Number of multi-turn bits in the position display (process data, CoE). The sum of the single-turn bits and multi-turn bits must be 32. Note: This parameter only influences the display and is independent of the physical resolution of the position sensor.	UINT8	RW	0x0C (12_{dec})
8000:14	Observer bandwidth	Bandwidth of the speed observer [Hz]	UINT16	RW	0x00C8 (200_{dec})
8000:15	Observer feed-forward	Load ratio [%] between internal rotor inertia of the motor and the total inertia of the driven system. Load ratio = internal moment of inertia / (internal moment of inertia + mass moment of inertia of the load). Examples: • 100% = load-free • 50 % = moments of inertia of input and output are equal	UINT8	RW	0x64 (100_{dec})
8000:17	Position offset	The Position offset is subtracted from the raw position of the encoder. It can only be written with the axis stopped.	UINT32	RW	0x00000000 (0_{dec})
8000:18	Secondary position offset	The Secondary Position Offset is subtracted from the "Secondary Position". It can only be written with the axis stopped.	UINT32	RW	0x00000000 (0_{dec})
8000:19	Gear ratio motor shaft revolutions	These parameters are used to scale all positions and speeds from the motor side to the load side of a gear unit. "Gear ratio motor shaft revolutions" describes the number of motor revolutions required to achieve the number of load revolutions configured in "Gear ratio driving shaft revolutions". Example: For a reduction gear in which 5 motor revolutions result in 2 load revolutions, set the parameters as follows: • Motor shaft revolutions = 5 • Driving shaft revolutions = 2	UINT32	RW	0x00000001 (1_{dec})
8000:1A	Gear ratio driving shaft revolutions		UINT32	RW	0x00000001 (1_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
8000:1B	Min position range limit	Lowest value for the position display of setpoints and actual values. If the value falls below this, an underflow to the value "Max position range limit" occurs. "Min position range limit" must always be lower than "Max position range limit".	UINT32	RW	0x00000000 (0_{dec})
8000:1C	Max position range limit	Highest value for the position display of setpoints and actual values. If this is exceeded, an overflow to the value "Min position range limit" occurs. "Max position range limit" must always be higher than "Min position range limit".	UINT32	RW	0xFFFFFFFF (4294967295_{dec})

Index 8001 FB Touch probe Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8001:0	FB Touch probe Settings Ch.1		UINT8	RO	0x16 (22_{dec})
8001:11	Touch probe 1 source	Selection of the input signal for Touch probe 1. Permitted values: • 1: Touch probe input 1 • 5: Hardware zero impulse	INT16	RW	0x0001 (1_{dec})
8001:12	Touch probe 2 source	Selection of the input signal for Touch probe 2. Permitted values: • 2: Touch probe input 2 • 5: Hardware zero impulse	INT16	RW	0x0002 (2_{dec})
8001:15	Touch probe 1 position source	Selection of the position held by Touch probe 1. Permitted values: • 0: FB Position • 1: FB Secondary Position	INT16	RW	0x0000 (0_{dec})
8001:16	Touch probe 2 position source	Selection of the position held by Touch probe 2. Permitted values: • 0: FB Position • 1: FB Secondary Position	INT16	RW	0x0000 (0_{dec})

Index 8008 FB Settings ENC Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8008:0	FB Settings ENC Ch.1		UINT8	RO	0x13 (19_{dec})
8008:01	Invert feedback direction	Changes the counting direction of the encoder. This parameter can be used to adapt the encoder direction of rotation to the motor direction of rotation.	BOOLEAN	RW	0x00 (0_{dec})
8008:12	Encoder type	permitted values: • 0: disabled • 1: RS422 differential • 2: TTL single ended • 6: TTL single ended - input filters disabled • 7: open collector	UINT16	RW	0x0000 (0_{dec})
8008:13	Encoder Increments per Revolution	Resolution of the encoder after 4-fold evaluation.	UINT32	RW	0x00001000 (4096_{dec})

Index 8010 DRV Amplifier Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8010:0	DRV Amplifier Settings Ch.1		UINT8	RO	0x73 (115_{dec}))
8010:01	Enable TxPDOToggle	Show TxPDO Toggle in the status word (bit 10).	BOOLEAN	RW	0x00 (0_{dec})
8010:02	Enable input cycle counter	1: enabled The Input cycle counter is a two-bit counter that is incremented with each process data cycle up to a maximum value of 3, after which it starts again at 0. The low bit is represented in bit 10 and the high bit in bit 14 of the status word.	BOOLEAN	RW	0x00 (0_{dec})
8010:04	Repeat find commutation	Repeat the commutation angle determination. (Effective for all FOC operation modes).	BOOLEAN	RW	0x01 (1_{dec})
8010:12	Current loop integral time	Integral component current controller [0.1 ms].	UINT16	RW	0x0032 (50_{dec})
8010:13	Current loop proportional gain	Proportional component current controller [0.1 V/A]	UINT16	RW	0x0032 (50_{dec})
8010:14	Velocity loop integral time	Integral component velocity controller [0.1 ms].	UINT32	RW	0x0000001E (30_{dec})
8010:15	Velocity loop proportional gain	Proportional component velocity controller [mA/(rad/s)].	UINT32	RW	0x00000096 (150_{dec})
8010:17	Position loop proportional gain	Proportional component position controller [1/s]	UINT32	RW	0x0000000A (10_{dec})
8010:31	Velocity limitation	Limitation of the drive speed set value [1/min]. (Only effective in the CSV and CSP controller operation modes) When using a gear ratio, this parameter refers to the load side.	UINT32	RW	0x000186A0 (100000_{dec})
8010:32	Short-Circuit Brake duration max	Max. duration of armature short circuit brake. [ms]	UINT16	RW	0x0000 (0_{dec})
8010:33	Stand still window	Tolerance window for standstill monitoring [1/min]	UINT16	RW	0x0001 (1_{dec})
8010:39	Select info data 1	permitted values: • 2: DC link voltage (mV) • 4: PCB temperature (0.1 °C) • 10: Digital inputs	UINT8	RW	0x02 (2_{dec})
8010:3A	Select info data 2	permitted values: • 2: DC link voltage (mV) • 4: PCB temperature (0.1 °C) • 10: Digital inputs	UINT8	RW	0x04 (4_{dec})
8010:49	Halt ramp deceleration	Halt ramp deceleration [0.1 rad / s²]	UINT32	RW	0x0000F570 (62832_{dec})
8010:50	Following error window	Following error monitoring: following error window. The value 0xFFFFFFFFF ($_{4294967295dec}$) disables the following error monitoring.	UINT32	RW	0xFFFFFFFF (4294967295_{dec})
8010:51	Following error time out	Following error monitoring: timeout [ms].	UINT16	RW	0x0000 (0_{dec})
8010:52	Fault reaction option code	permitted values: • 0: Disable drive function, motor is free to rotate • 1: Slow down on slow down ramp • 65534_{dec}: Short circuit brake	UINT16	RW	0x0001 (1_{dec})
8010:54	Feature bits	--	UINT32	RW	0x00000000 (0_{dec})
8010:57	Position loop velocity feed forward gain	Scaling factor for velocity pre-control from the position interpolator.	UINT8	RW	0x64 (100_{dec})
8010:58	Select info data 3	permitted values: • 2: DC link voltage (mV) • 4: PCB temperature (0.1 °C) • 10: Digital inputs	UINT8	RW	0x0A (10_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
8010:59	Error suppression mask		UINT32	RW	0x00000000 (0_{dec})
8010:62	Position loop deadband window	Deadband window of the position controller. Unit: corresponds to the process data scaling of the set position and actual positions.	UINT32	RW	0x00000000 (0_{dec})
8010:63	Find commutation time	For field-oriented control (FOC) with an incremental encoder, commutation determination is required, during which nominal current is applied to the motor. The "Find commutation time" describes the time used for this.	UINT16	RW	0x000A (10_{dec})
8010:64	Commutation type	permitted values: • 16: Stepper with internal counter • 17: Stepper with encoder • 18: Stepper FOC with encoder	UINT8	RW	0x10 (16_{dec})
8010:65	Invert direction of rotation	Inverting the direction of rotation. This parameter inverts all setpoints and actual values and is used to ensure that the motor rotates in the correct direction for the application. Note: This parameter is not suitable for adapting the directions of rotation of the encoder and motor to each other. Use 8008:01 "Invert feedback direction" for this purpose.	BOOLEAN	RW	0x00 (0_{dec})
8010:6D	Torque feed forward gain	Internal torque pre-control: scaling factor	UINT32	RW	0x00000064 (100_{dec})
8010:6E	Torque feed forward filter time	Internal torque pre-control: filter time. [0.1 ms]	UINT32	RW	0x0000000A (10_{dec})
8010:6F	Torque offset	Torque offset. The value is given in thousandths of the nominal current.	INT16	RW	0x0000 (0_{dec})
8010:70	Torque limitation option code	Selection of the behavior in the CST controller operation mode (“Cyclic Synchronous Torque”). Permitted values: • 0: VeloLimitHasNoEffect • 1: TorqueMightBeReducedToZero • 2: TorqueMightBeReducedToRampPosNeg • 3: TorqueMightBeReducedToRampPosMaxTorqueNeg • 4: TorqueMightBeReducedToMaxTorquePosNeg	INT8	RW	0x00 (0_{dec})
8010:72	Stand still torque limitation	Only valid for commutation types "Stepper with internal counter" and "Stepper with encoder" (can be set via parameter 8010:64). Configures a current reduction at standstill, i.e. when the target velocity is within the "Stand still window" (parameter 8010:33). The value is given in thousandths of the nominal current.	UINT16	RW	0x7FFF (32767_{dec})
8010:73	Acceleration limitation	Limits the maximum acceleration or deceleration. [0.1 rad/s²]	UINT32	RW	0x0000F570 (62832_{dec})

Index 8011 DRV Motor Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8011:0	DRV Motor Settings Ch.1		UINT8	RO	0x34 (52_{dec})
8011:12	Rated current	The nominal current of the motor (data sheet value). Used for scaling "Torque actual value" and "Target torque".	UINT32	RW	0x00000BB8 (3000_{dec})
8011:16	Torque constant	Force constant of the motor.	UINT32	RW	0x0000012C (300_{dec})
8011:18	Rotor moment of inertia	Moment of inertia of the motor.	UINT32	RW	0x000001EF (495_{dec})
8011:19	Winding inductance	Winding inductance.	UINT16	RW	0x0186 (390_{dec})
8011:1B	Motor speed limitation	Speed limit of the motor. When using a gear ratio, this limit still refers to the motor side.	UINT32	RW	0x000186A0 (100000_{dec})
8011:2E	Rated speed	Nominal speed of the motor.	UINT32	RW	0x000003E8 (1000_{dec})
8011:30	Winding resistance	Winding resistance of the motor.	UINT32	RW	0x00000578 (1400_{dec})
8011:31	Voltage constant	Voltage constant of the motor.	UINT32	RW	0x00004E20 (20000_{dec})
8011:33	Motor fullsteps per revolution	Number of full motor steps per revolution.	UINT32	RW	0x000000C8 (200_{dec})
8011:34	Configured motor current	Configured motor current. If this is smaller than the "Rated current", the motor current is limited to the smaller of the two values. This value is used to distribute the load between the two channels of the terminal.	UINT32	RW	0x00000BB8 (3000_{dec})

Index 8012 DRV Brake Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8012:0	DRV Brake Settings Ch.1		UINT8	RO	0x14 (20_{dec})
8012:01	Enable manual override	• True: The brake state is forced manually via the CoE. • False: The brake is automatically controlled by the drive controller.	BOOLEAN	RW	0x00 (0_{dec})
8012:02	Manual brake state	Permitted values: • 0: Release • 1: Apply	BIT1	RW	0x00 (0_{dec})
8012:05	Brake option	Permitted values: • 0: Enable output to release brake (for brakes that are released in the energized state) • 1: Disable output to release brake (for brakes that are released in a de-energized state)	BIT4	RW	0x00 (0_{dec})
8012:09	External override	Enables the brake to be released via an external hardware signal. The brake can only be released via the external signal, not applied. You can select which hardware input (Touch probe 1 / Touch probe 2) is used for this. It is also possible to restrict whether this configuration is always active or only in the EtherCAT states INIT/ PREOP/SAFEOP, i.e. when the drive is not fully operational (e.g. during maintenance work) Permitted values: • 0: Disabled • 2: Digital Input 1 • 3: Digital Input 1 (only INIT/PREOP/SAFEOP) • 4: Digital Input 2 • 5: Digital Input 2 (only INIT/PREOP/SAFEOP)	UINT8	RW	0x00 (0_{dec})
8012:11	Release delay	Time required for the holding brake to release after the current has been applied.	UINT16	RW	0x0000 (0_{dec})
8012:12	Application delay	Time required for the holding brake to apply after the current was switched off.	UINT16	RW	0x0000 (0_{dec})
8012:13	Emergency application timeout	Time that the amplifier waits for the speed to reach the standstill limit after a stop request. If the waiting time is exceeded, the holding brake is triggered, regardless of the speed. Note: This parameter must be set at least to the longest time the axis needs to come to a standstill after it has been switched torque-free. For vertical axes, this parameter should be set to a low value to prevent the axis or load from falling very far. Unit: ms	UINT16	RW	0x0000 (0_{dec})
8012:14	Brake moment of inertia	Moment of inertia of the brake. Unit: g cm²	UINT16	RW	0x0000 (0_{dec})

Index 8013 DRV Filter Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8013:0	DRV Filter Settings Ch.1		UINT8	RO	0x19 (25_{dec})
8013:10	Low pass frequency 1		REAL32	RW	0x00000000 (0_{dec})
8013:11	Low pass damping 1		REAL32	RW	0x00000000 (0_{dec})
8013:12	High pass frequency 1		REAL32	RW	0x00000000 (0_{dec})
8013:13	High pass damping 1		REAL32	RW	0x00000000 (0_{dec})
8013:14	Filter type 1	permitted values: • 0: No_Filter • 1: Low_pass_filter_1_order • 2: Phase_correction_filter_1_order • 3: Low_pass_filter_2_order • 4: Phase_correction_filter_2_order • 5: Notch_filter	INT16	RW	0x0000 (0_{dec})
8013:15	Low pass frequency 2		REAL32	RW	0x00000000 (0_{dec})
8013:16	Low pass damping 2		REAL32	RW	0x00000000 (0_{dec})
8013:17	High pass frequency 2		REAL32	RW	0x00000000 (0_{dec})
8013:18	High pass damping 2		REAL32	RW	0x00000000 (0_{dec})
8013:19	Filter type 2	permitted values: • 0: No_Filter • 1: Low_pass_filter_1_order • 2: Phase_correction_filter_1_order • 3: Low_pass_filter_2_order • 4: Phase_correction_filter_2_order • 5: Notch_filter	INT16	RW	0x0000 (0_{dec})

Index 801F DRV Vendor data Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
801F:0	DRV Vendor data Ch.1		UINT8	RO	0x1C (28_{dec})
801F:12	Amplifier rated current	Maximum current per channel (without fan).	UINT32	RW	0x00001388 (5000_{dec})
801F:14	Amplifier overcurrent threshold	Switching threshold for the overcurrent switch-off.	UINT32	RW	0x00002710 (10000_{dec})
801F:15	Max rotary field frequency		UINT16	RW	0x0257 (599_{dec})
801F:17	Amplifier rated current with fan	Maximum current per channel (with fan)	UINT32	RW	0x00001770 (6000_{dec})
801F:18	Vendor feature bits		UINT32	RW	0x00000000 (0_{dec})
801F:1A	Amplifier Rated Sum Current	Maximum sum current for all channels (without fan)	UINT32	RW	0x00001770 (6000_{dec})
801F:1C	Amplifier Rated Sum Current with Fan	Maximum sum current for all channels (with fan)	UINT32	RW	0x00002710 (10000_{dec})

Index 8060 DMC Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8060:0	DMC Settings Ch.1		UINT8	RO	0x17 (23_{dec})
8060:07	Emergency deceleration	Deceleration for the emergency stop ramp. (In ms from motor nominal speed to standstill) Unit: 1 ms	UINT16	RW	0x0064 (100_{dec})
8060:08	Calibration position	If homing is successful, the "Actual position" is set to this value.	INT64	RW	
8060:09	Calibration velocity (towards plc cam)	Velocity when hitting the cam in 10000ths of the motor nominal speed.	INT16	RW	0x0064 (100_{dec})
8060:0A	Calibration Velocity (off plc cam)	Velocity when driving off the cam in 10000ths of the motor nominal speed.	INT16	RW	0x000A (10_{dec})
8060:0E	Modulo factor	Feedback increments for one mechanical revolution.	INT64	RW	
8060:12	Block calibration torque limit	Torque limitation for approaching the end stop. In parts per thousand of the nominal motor current.	UINT16	RW	0x0064 (100_{dec})
8060:13	Block calibration stop distance	After reaching the calibration position, the axis moves out of the end position by this distance.	INT64	RW	
8060:14	Block calibration lag threshold	When this following error is exceeded, the axis is in the end position.	INT64	RW	
8060:15	Target position window	Target position window: The In-Target bit is set when the axis is within this window for at least the time set in 8060:16.	INT64	RW	
8060:16	Target position monitor time	see 8060:15 Unit: ms	UINT16	RW	0x0014 (20_{dec})
8060:17	Target position timeout	When the setpoint generator has reached its end position and the axis is not in the target window after this time has elapsed, the task is terminated and the in-target bit is not set. Unit: ms	UINT16	RW	0x1770 (6000_{dec})

Index 8061 DMC Features Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8061:0	DMC Features Ch.1		UINT8	RO	0x1B (27_{dec})
8061:13	Invert calibration cam search direction	Invert the direction of movement to search for the limit switch. Default: FALSE = search with positive direction of rotation.	BOOLEAN	RW	0x00 (0_{dec})
8061:14	Invert sync impulse search direction	Invert the direction of rotation to exit the limit switch. Default: TRUE = exit in negative direction of rotation.	BOOLEAN	RW	0x01 (1_{dec})
8061:19	Calibration cam source	Source for the reference switch. • 0: Input 1 • 1: Input 2	UINT8	RW	0x00 (0_{dec})
8061:1A	Calibration cam active level	State of the reference switch in the actuated state. • 0: Hi • 1: Low	UINT8	RW	0x00 (0_{dec})
8061:1B	Latch source	Source for the latch unit. • 0: Input 1 • 1: Input 2	UINT8	RW	0x00 (0_{dec})

Index 8100 FB Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8100:0	FB Settings Ch.2		UINT8	RO	0x1C (28_{dec})
8100:11	Device type		UINT32	RW	0x00000005 (5_{dec})
8100:12	Singleturn bits	Number of single-turn bits in the position display (process data, CoE). The sum of the single-turn bits and multi-turn bits must be 32. Note: This parameter only influences the display and is independent of the physical resolution of the position sensor.	UINT8	RW	0x14 (20_{dec})
8100:13	Multiturn bits	Number of multi-turn bits in the position display (process data, CoE). The sum of the single-turn bits and multi-turn bits must be 32. Note: This parameter only influences the display and is independent of the physical resolution of the position sensor.	UINT8	RW	0x0C (12_{dec})
8100:14	Observer bandwidth	Bandwidth of the speed observer [Hz]	UINT16	RW	0x00C8 (200_{dec})
8100:15	Observer feed-forward	Load ratio [%] between internal rotor inertia of the motor and the total inertia of the driven system. Load ratio = internal moment of inertia / (internal moment of inertia + mass moment of inertia of the load). Examples: • 100% = load-free • 50 % = moments of inertia of input and output are equal	UINT8	RW	0x64 (100_{dec})
8100:17	Position offset	The Position offset is subtracted from the raw position of the encoder. It can only be written with the axis stopped.	UINT32	RW	0x00000000 (0_{dec})
8100:18	Secondary position offset	The Secondary Position Offset is subtracted from the "Secondary Position". It can only be written with the axis stopped.	UINT32	RW	0x00000000 (0_{dec})
8100:19	Gear ratio motor shaft revolutions	These parameters are used to scale all positions and speeds from the motor side to the load side of a gear unit. "Gear ratio motor shaft revolutions" describes the number of motor revolutions required to achieve the number of load revolutions configured in "Gear ratio driving shaft revolutions". Example: For a reduction gear in which 5 motor revolutions result in 2 load revolutions, set the parameters as follows: • Motor shaft revolutions = 5 • Driving shaft revolutions = 2	UINT32	RW	0x00000001 (1_{dec})
8100:1A	Gear ratio driving shaft revolutions		UINT32	RW	0x00000001 (1_{dec})
8100:1B	Min position range limit	Lowest value for the position display of setpoints and actual values. If the value falls below this, an underflow to the value "Max position range limit" occurs. "Min position range limit" must always be lower than "Max position range limit".	UINT32	RW	0x00000000 (0_{dec})
8100:1C	Max position range limit	Highest value for the position display of setpoints and actual values. If this is exceeded, an overflow to the value "Min position range limit" occurs. "Max position range limit" must always be higher than "Min position range limit".	UINT32	RW	0xFFFFFFFF (4294967295_{dec})

Index 8101 FB Touch probe Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8101:0	FB Touch probe Settings Ch.2		UINT8	RO	0x16 (22_{dec})
8101:11	Touch probe 1 source	Selection of the input signal for Touch probe 1. Permitted values: • 1: Touch probe input 1 • 5: Hardware zero impulse	INT16	RW	0x0001 (1_{dec})
8101:12	Touch probe 2 source	Selection of the input signal for Touch probe 2. Permitted values: • 2: Touch probe input 2 • 5: Hardware zero impulse	INT16	RW	0x0002 (2_{dec})
8101:15	Touch probe 1 position source	Selection of the position held by Touch probe 1. Permitted values: • 0: FB Position • 1: FB Secondary Position	INT16	RW	0x0000 (0_{dec})
8101:16	Touch probe 2 position source	Selection of the position held by Touch probe 2. Permitted values: • 0: FB Position • 1: FB Secondary Position	INT16	RW	0x0000 (0_{dec})

Index 8108 FB Settings ENC Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8108:0	FB Settings ENC Ch.2		UINT8	RO	0x13 (19_{dec})
8108:01	Invert feedback direction	Changes the counting direction of the encoder. This parameter can be used to adapt the encoder direction of rotation to the motor direction of rotation.	BOOLEAN	RW	0x00 (0_{dec})
8108:12	Encoder type	permitted values: • 0: disabled • 1: RS422 differential • 2: TTL single ended • 6: TTL single ended - input filters disabled • 7: open collector	UINT16	RW	0x0000 (0_{dec})
8108:13	Encoder Increments per Revolution	Resolution of the encoder after 4-fold evaluation.	UINT32	RW	0x00001000 (4096_{dec})

Index 8110 DRV Amplifier Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8110:0	DRV Amplifier Settings Ch.2		UINT8	RO	0x73 (115_{dec}))
8110:01	Enable TxPDOToggle	Show TxPDO Toggle in the status word (bit 10).	BOOLEAN	RW	0x00 (0_{dec})
8110:02	Enable input cycle counter	1: enabled The Input cycle counter is a two-bit counter that is incremented with each process data cycle up to a maximum value of 3, after which it starts again at 0. The low bit is represented in bit 10 and the high bit in bit 14 of the status word.	BOOLEAN	RW	0x00 (0_{dec})
8110:04	Repeat find commutation	Repeat the commutation angle determination. (Effective for all FOC operation modes).	BOOLEAN	RW	0x01 (1_{dec})
8110:12	Current loop integral time	Integral component current controller [0.1 ms].	UINT16	RW	0x0032 (50_{dec})
8110:13	Current loop proportional gain	Proportional component current controller [0.1 V/A]	UINT16	RW	0x0032 (50_{dec})
8110:14	Velocity loop integral time	Integral component velocity controller [0.1 ms].	UINT32	RW	0x0000001E (30_{dec})
8110:15	Velocity loop proportional gain	Proportional component velocity controller [mA/(rad/s)].	UINT32	RW	0x00000096 (150_{dec})
8110:17	Position loop proportional gain	Proportional component position controller [1/s]	UINT32	RW	0x0000000A (10_{dec})
8110:31	Velocity limitation	Limitation of the drive speed set value [1/min]. (Only effective in the CSV and CSP controller operation modes) When using a gear ratio, this parameter refers to the load side.	UINT32	RW	0x000186A0 (100000_{dec})
8110:32	Short-Circuit Brake duration max	Max. duration of armature short circuit brake. [ms]	UINT16	RW	0x0000 (0_{dec})
8110:33	Stand still window	Tolerance window for standstill monitoring [1/min]	UINT16	RW	0x0001 (1_{dec})
8110:39	Select info data 1	permitted values: • 2: DC link voltage (mV) • 4: PCB temperature (0.1 °C) • 10: Digital inputs	UINT8	RW	0x02 (2_{dec})
8110:3A	Select info data 2	permitted values: • 2: DC link voltage (mV) • 4: PCB temperature (0.1 °C) • 10: Digital inputs	UINT8	RW	0x04 (4_{dec})
8110:49	Halt ramp deceleration	Halt ramp deceleration [0.1 rad / s²]	UINT32	RW	0x0000F570 (62832_{dec})
8110:50	Following error window	Following error monitoring: following error window. The value 0xFFFFFFFFF ($_{4294967295dec}$) disables the following error monitoring.	UINT32	RW	0xFFFFFFFF (4294967295_{dec})
8110:51	Following error time out	Following error monitoring: timeout [ms].	UINT16	RW	0x0000 (0_{dec})
8110:52	Fault reaction option code	permitted values: • 0: Disable drive function, motor is free to rotate • 1: Slow down on slow down ramp • 65534_{dec}: Short circuit brake	UINT16	RW	0x0001 (1_{dec})
8110:54	Feature bits	--	UINT32	RW	0x00000000 (0_{dec})
8110:57	Position loop velocity feed forward gain	Scaling factor for velocity pre-control from the position interpolator.	UINT8	RW	0x64 (100_{dec})
8110:58	Select info data 3	permitted values: • 2: DC link voltage (mV) • 4: PCB temperature (0.1 °C) • 10: Digital inputs	UINT8	RW	0x0A (10_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
8110:59	Error suppression mask		UINT32	RW	0x00000000 (0_{dec})
8110:62	Position loop deadband window	Deadband window of the position controller. Unit: corresponds to the process data scaling of the set position and actual positions.	UINT32	RW	0x00000000 (0_{dec})
8110:63	Find commutation time	For field-oriented control (FOC) with an incremental encoder, commutation determination is required, during which nominal current is applied to the motor. The "Find commutation time" describes the time used for this.	UINT16	RW	0x000A (10_{dec})
8110:64	Commutation type	permitted values: • 16: Stepper with internal counter • 17: Stepper with encoder • 18: Stepper FOC with encoder	UINT8	RW	0x10 (16_{dec})
8110:65	Invert direction of rotation	Inverting the direction of rotation. This parameter inverts all setpoints and actual values and is used to ensure that the motor rotates in the correct direction for the application. Note: This parameter is not suitable for adapting the directions of rotation of the encoder and motor to each other. Use 8008:01 "Invert feedback direction" for this purpose.	BOOLEAN	RW	0x00 (0_{dec})
8110:6D	Torque feed forward gain	Internal torque pre-control: scaling factor	UINT32	RW	0x00000064 (100_{dec})
8110:6E	Torque feed forward filter time	Internal torque pre-control: filter time. [0.1 ms]	UINT32	RW	0x0000000A (10_{dec})
8110:6F	Torque offset	Torque offset. The value is given in thousandths of the nominal current.	INT16	RW	0x0000 (0_{dec})
8110:70	Torque limitation option code	Selection of the behavior in the CST controller operation mode (“Cyclic Synchronous Torque”). Permitted values: • 0: VeloLimitHasNoEffect • 1: TorqueMightBeReducedToZero • 2: TorqueMightBeReducedToRampPosNeg • 3: TorqueMightBeReducedToRampPosMaxTorqueNeg • 4: TorqueMightBeReducedToMaxTorquePosNeg	INT8	RW	0x00 (0_{dec})
8110:72	Stand still torque limitation	Only valid for commutation types "Stepper with internal counter" and "Stepper with encoder" (can be set via parameter 8110:64). Configures a current reduction at standstill, i.e. when the target velocity is within the "Stand still window" (parameter 8110:33). The value is given in thousandths of the nominal current.	UINT16	RW	0x7FFF (32767_{dec})
8110:73	Acceleration limitation	Limits the maximum acceleration or deceleration. [0.1 rad/s²]	UINT32	RW	0x0000F570 (62832_{dec})

Index 8111 DRV Motor Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8111:0	DRV Motor Settings Ch.2		UINT8	RO	0x34 (52_{dec})
8111:12	Rated current	The nominal current of the motor (data sheet value). Used for scaling "Torque actual value" and "Target torque".	UINT32	RW	0x00000BB8 (3000_{dec})
8111:16	Torque constant	Force constant of the motor.	UINT32	RW	0x0000012C (300_{dec})
8111:18	Rotor moment of inertia	Moment of inertia of the motor.	UINT32	RW	0x000001EF (495_{dec})
8111:19	Winding inductance	Winding inductance.	UINT16	RW	0x0186 (390_{dec})
8111:1B	Motor speed limitation	Speed limit of the motor. When using a gear ratio, this limit still refers to the motor side.	UINT32	RW	0x000186A0 (100000_{dec})
8111:2E	Rated speed	Nominal speed of the motor.	UINT32	RW	0x000003E8 (1000_{dec})
8111:30	Winding resistance	Winding resistance of the motor.	UINT32	RW	0x00000578 (1400_{dec})
8111:31	Voltage constant	Voltage constant of the motor.	UINT32	RW	0x00004E20 (20000_{dec})
8111:33	Motor fullsteps per revolution	Number of full motor steps per revolution.	UINT32	RW	0x000000C8 (200_{dec})
8111:34	Configured motor current	Configured motor current. If this is smaller than the "Rated current", the motor current is limited to the smaller of the two values. This value is used to distribute the load between the two channels of the terminal.	UINT32	RW	0x00000BB8 (3000_{dec})

Index 8112 DRV Brake Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8112:0	DRV Brake Settings Ch.2		UINT8	RO	0x14 (20_{dec})
8112:01	Enable manual override	• True: The brake state is forced manually via the CoE. • False: The brake is automatically controlled by the drive controller.	BOOLEAN	RW	0x00 (0_{dec})
8112:02	Manual brake state	Permitted values: • 0: Release • 1: Apply	BIT1	RW	0x00 (0_{dec})
8112:05	Brake option	Permitted values: • 0: Enable output to release brake (for brakes that are released in the energized state) • 1: Disable output to release brake (for brakes that are released in a de-energized state)	BIT4	RW	0x00 (0_{dec})
8112:09	External override	Enables the brake to be released via an external hardware signal. The brake can only be released via the external signal, not applied. You can select which hardware input (Touch probe 1 / Touch probe 2) is used for this. It is also possible to restrict whether this configuration is always active or only in the EtherCAT states INIT/ PREOP/SAFEOP, i.e. when the drive is not fully operational (e.g. during maintenance work) Permitted values: • 0: Disabled • 2: Digital Input 1 • 3: Digital Input 1 (only INIT/PREOP/SAFEOP) • 4: Digital Input 2 • 5: Digital Input 2 (only INIT/PREOP/SAFEOP)	UINT8	RW	0x00 (0_{dec})
8112:11	Release delay	Time required for the holding brake to release after the current has been applied.	UINT16	RW	0x0000 (0_{dec})
8112:12	Application delay	Time required for the holding brake to apply after the current was switched off.	UINT16	RW	0x0000 (0_{dec})
8112:13	Emergency application timeout	Time that the amplifier waits for the speed to reach the standstill limit after a stop request. If the waiting time is exceeded, the holding brake is triggered, regardless of the speed. Note: This parameter must be set at least to the longest time the axis needs to come to a standstill after it has been switched torque-free. For vertical axes, this parameter should be set to a low value to prevent the axis or load from falling very far. Unit: ms	UINT16	RW	0x0000 (0_{dec})
8112:14	Brake moment of inertia	Moment of inertia of the brake. Unit: g cm²	UINT16	RW	0x0000 (0_{dec})

Index 8113 DRV Filter Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8113:0	DRV Filter Settings Ch.2		UINT8	RO	0x19 (25_{dec})
8113:10	Low pass frequency 1		REAL32	RW	0x00000000 (0_{dec})
8113:11	Low pass damping 1		REAL32	RW	0x00000000 (0_{dec})
8113:12	High pass frequency 1		REAL32	RW	0x00000000 (0_{dec})
8113:13	High pass damping 1		REAL32	RW	0x00000000 (0_{dec})
8113:14	Filter type 1	permitted values: • 0: No_Filter • 1: Low_pass_filter_1_order • 2: Phase_correction_filter_1_order • 3: Low_pass_filter_2_order • 4: Phase_correction_filter_2_order • 5: Notch_filter	INT16	RW	0x0000 (0_{dec})
8113:15	Low pass frequency 2		REAL32	RW	0x00000000 (0_{dec})
8113:16	Low pass damping 2		REAL32	RW	0x00000000 (0_{dec})
8113:17	High pass frequency 2		REAL32	RW	0x00000000 (0_{dec})
8113:18	High pass damping 2		REAL32	RW	0x00000000 (0_{dec})
8113:19	Filter type 2	permitted values: • 0: No_Filter • 1: Low_pass_filter_1_order • 2: Phase_correction_filter_1_order • 3: Low_pass_filter_2_order • 4: Phase_correction_filter_2_order • 5: Notch_filter	INT16	RW	0x0000 (0_{dec})

Index 811F DRV Vendor data Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
811F:0	DRV Vendor data Ch.2		UINT8	RO	0x1C (28_{dec})
811F:12	Amplifier rated current	Maximum current per channel (without fan).	UINT32	RW	0x00001388 (5000_{dec})
811F:14	Amplifier overcurrent threshold	Switching threshold for the overcurrent switch-off.	UINT32	RW	0x00002710 (10000_{dec})
811F:15	Max rotary field frequency		UINT16	RW	0x0257 (599_{dec})
811F:17	Amplifier rated current with fan	Maximum current per channel (with fan)	UINT32	RW	0x00001770 (6000_{dec})
811F:18	Vendor feature bits		UINT32	RW	0x00000000 (0_{dec})
811F:1A	Amplifier Rated Sum Current	Maximum sum current for all channels (without fan)	UINT32	RW	0x00001770 (6000_{dec})
811F:1C	Amplifier Rated Sum Current with Fan	Maximum sum current for all channels (with fan)	UINT32	RW	0x00002710 (10000_{dec})

Index 8160 DMC Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8160:0	DMC Settings Ch.2		UINT8	RO	0x17 (23_{dec})
8160:07	Emergency deceleration	Deceleration for the emergency stop ramp. (In ms from motor nominal speed to standstill) Unit: 1 ms	UINT16	RW	0x0064 (100_{dec})
8160:08	Calibration position	If homing is successful, the "Actual position" is set to this value.	INT64	RW	
8160:09	Calibration velocity (towards plc cam)	Velocity when hitting the cam in 10000ths of the motor nominal speed.	INT16	RW	0x0064 (100_{dec})
8160:0A	Calibration Velocity (off plc cam)	Velocity when driving off the cam in 10000ths of the motor nominal speed.	INT16	RW	0x000A (10_{dec})
8160:0E	Modulo factor	Feedback increments for one mechanical revolution.	INT64	RW	
8160:12	Block calibration torque limit	Torque limitation for approaching the end stop. In parts per thousand of the nominal motor current.	UINT16	RW	0x0064 (100_{dec})
8160:13	Block calibration stop distance	After reaching the calibration position, the axis moves out of the end position by this distance.	INT64	RW	
8160:14	Block calibration lag threshold	When this following error is exceeded, the axis is in the end position.	INT64	RW	
8160:15	Target position window	Target position window: The In-Target bit is set when the axis is within this window for at least the time set in 8160:16.	INT64	RW	
8160:16	Target position monitor time	see 8160:15 Unit: ms	UINT16	RW	0x0014 (20_{dec})
8160:17	Target position timeout	When the setpoint generator has reached its end position and the axis is not in the target window after this time has elapsed, the task is terminated and the in-target bit is not set. Unit: ms	UINT16	RW	0x1770 (6000_{dec})

Index 8161 DMC Features Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8161:0	DMC Features Ch.2		UINT8	RO	0x1B (27_{dec})
8161:13	Invert calibration cam search direction	Invert the direction of movement to search for the limit switch. Default: FALSE = search with positive direction of rotation.	BOOLEAN	RW	0x00 (0_{dec})
8161:14	Invert sync impulse search direction	Invert the direction of rotation to exit the limit switch. Default: TRUE = exit in negative direction of rotation.	BOOLEAN	RW	0x01 (1_{dec})
8161:19	Calibration cam source	Source for the reference switch. • 0: Input 1 • 1: Input 2	UINT8	RW	0x00 (0_{dec})
8161:1A	Calibration cam active level	State of the reference switch in the actuated state. • 0: Hi • 1: Low	UINT8	RW	0x00 (0_{dec})
8161:1B	Latch source	Source for the latch unit. • 0: Input 1 • 1: Input 2	UINT8	RW	0x00 (0_{dec})

Index F800 DRV Amplifier Settings

Index (hex)	Name	Meaning	Data type	Flags	Default
F800:0	DRV Amplifier Settings		UINT8	RO	0x18 (24_{dec})
F800:10	Nominal DC link voltage	Nominal DC link voltage.	UINT32	RW	0x0000BB80 (48000_{dec})
F800:11	Min DC link voltage	Min. DC link voltage. If the value falls below this, a drive error is triggered or an inactive axis cannot be switched on.	UINT32	RW	0x00001A90 (6800_{dec})
F800:12	Max DC link voltage	Max. DC link voltage. If this value is exceeded, a drive error is triggered or an inactive axis cannot be switched on.	UINT32	RW	0x0000EA60 (60000_{dec})
F800:15	Amplifier Temperature warn level	Amplifier temperature warning threshold.	UINT16	RW	0x0320 (800_{dec})
F800:16	Amplifier Temperature error level	Amplifier temperature error threshold.	UINT16	RW	0x03E8 (1000_{dec})
F800:17	Feature bits		UINT32	RW	0x00000000 (0_{dec})
F800:18	Fan Configuration	An external fan can be used to increase the permissible motor current for the terminal. Permitted values: • 0: no fan • 1: fan installed	UINT8	RW	0x00 (0_{dec})

8.1.2 Diagnostic objects

Index 9010 DRV Info data Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
9010:0	DRV Info data Ch.1		UINT8	RO	0x28 (40_{dec}))
9010:13	Supported drive modes		UINT32	RO	0x00000000 (0_{dec}))
9010:14	Velocity encoder resolution		UINT32	RO	0x00000000 (0_{dec}))
9010:15	Position encoder resolution increments		UINT32	RO	0x00000000 (0_{dec}))
9010:16	Position encoder resolution revolutions		UINT32	RO	0x00000000 (0_{dec}))
9010:17	Cogging compensation supported		BOOLEAN	RO	0x00 (0_{dec}))
9010:27	Output stage safety state	permitted values: • 0: safe_state • 1: ready_state	UINT8	RO	0x00 (0_{dec}))
9010:28	Actual motor brake state	permitted values: • 0: Motor brake applied • 1: Motor brake released	UINT8	RO	0x00 (0_{dec}))

Index 9110 DRV Info data Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
9110:0	DRV Info data Ch.2		UINT8	RO	0x28 (40_{dec}))
9110:13	Supported drive modes		UINT32	RO	0x00000000 (0_{dec}))
9110:14	Velocity encoder resolution		UINT32	RO	0x00000000 (0_{dec}))
9110:15	Position encoder resolution increments		UINT32	RO	0x00000000 (0_{dec}))
9110:16	Position encoder resolution revolutions		UINT32	RO	0x00000000 (0_{dec}))
9110:17	Cogging compensation supported		BOOLEAN	RO	0x00 (0_{dec}))
9110:27	Output stage safety state	permitted values: • 0: safe_state • 1: ready_state	UINT8	RO	0x00 (0_{dec}))
9110:28	Actual motor brake state	permitted values: • 0: Motor brake applied • 1: Motor brake released	UINT8	RO	0x00 (0_{dec}))

Index F900 DRV Info data

Index (hex)	Name	Meaning	Data type	Flags	Default
F900:0	DRV Info data		UINT8	RO	0x13 (19_{dec}))
F900:11	Amplifier temperature		INT16	RO	0x0000 (0_{dec}))
F900:12	DC link voltage		UINT32	RO	0x00000000 (0_{dec}))
F900:13	Supply voltage Up		UINT32	RO	0x00000000 (0_{dec}))

Index F913 DRV Device Info data

Index (hex)	Name	Meaning	Data type	Flags	Default
F913:0	DRV Device Info data		UINT8	RO	0x04 (4_{dec}))
F913:01	HW config		STRING	RO	
F913:02	FB config		STRING	RO	
F913:03	FW info		STRING	RO	
F913:04	DMC version		STRING	RO	

8.1.3 Standard objects

Index 1000 Device type

Index (hex)	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: the Lo-Word contains the used CoE profile (5001). The Hi-Word contains the module profile according to the modular device profile.	UINT32	RO	0x00001389 (5001_{dec}))

Index 1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EL7062-0000

Index 1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	STRING	RO	

Index 100A Software version

Index (hex)	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slave	STRING	RO	01

Index 100B Bootloader version

Index (hex)	Name	Meaning	Data type	Flags	Default
100B:0	Bootloader version		STRING	RO	N/A

Index 1011 Restore default parameters

Index (hex)	Name	Meaning	Data type	Flags	Default
1011:0	Restore default parameters	Restore default parameters	UINT8	RO	0x01 (1_{dec}))
1011:01	SubIndex 001	If this object is set to "0x64616F6C" in the set value dialog, all backup objects are reset to their delivery state.	UINT32	RW	0x00000000 (0_{dec}))

Index 1018 Identity

Index (hex)	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4_{dec}))
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2_{dec}))
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x1B963052 (462827602_{dec}))
1018:03	Revision	Revision number of the EtherCAT slave; the Low Word (bit 0-15) indicates the special terminal number, the High Word (bit 16-31) refers to the device description	UINT32	RO	0x00000000 (0_{dec}))
1018:04	Serial number	Serial number of the EtherCAT slave; the Low Byte (bit 0-7) of the Low Word contains the year of production, the High Byte (bit 8-15) of the Low Word contains the week of production, the High Word (bit 16-31) is 0	UINT32	RO	0x00000000 (0_{dec}))

Index 10E2 Manufacturer-specific Identification Code

Index (hex)	Name	Meaning	Data type	Flags	Default
10E2:0	Manufacturer-specific Identification Code		UINT8	RO	0x01 (1_{dec}))
10E2:01	SubIndex 001		STRING	RO	

Index 10F0 Backup parameter handling

Index (hex)	Name	Meaning	Data type	Flags	Default
10F0:01	Checksum	Checksum across all backup entries of the EtherCAT slave	UINT32	RO	0x00000000 (0_{dec}))

Index 10F3 Diagnosis History

Index (hex)	Name	Meaning	Data type	Flags	Default
10F3:0	Diagnosis History		UINT8	RO	0x37 (55_{dec}))
10F3:01	Maximum Messages		UINT8	RO	0x00 (0_{dec}))
10F3:02	Newest Message		UINT8	RO	0x00 (0_{dec}))
10F3:03	Newest Acknowledged Message		UINT8	RW	0x00 (0_{dec}))
10F3:04	New Messages Available		BOOLEAN	RO	0x00 (0_{dec}))
10F3:05	Flags		UINT16	RW	0x0000 (0_{dec}))
10F3:06	Diagnosis Message 001		OCTET-STRING[32]	RO	{0}
10F3:07	Diagnosis Message 002		OCTET-STRING[32]	RO	{0}
10F3:08	Diagnosis Message 003		OCTET-STRING[32]	RO	{0}
…	…	…	…	…	…
10F3:35	Diagnosis Message 048		OCTET-STRING[32]	RO	{0}
10F3:36	Diagnosis Message 049		OCTET-STRING[32]	RO	{0}
10F3:37	Diagnosis Message 050		OCTET-STRING[32]	RO	{0}

Index 10F8 Timestamp Object

Index (hex)	Name	Meaning	Data type	Flags	Default
10F8:0	Timestamp Object		UINT64	RO	

Index 1460 DMC RxPDO-Par Outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1460:0	DMC RxPDO-Par Outputs Ch.1	PDO Parameter RxPDO 97	UINT8	RO	0x06 (6_{dec}))
1460:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 97	OCTET-STRING[2]	RO	61 16

Index 1461 DMC RxPDO-Par Outputs 32 Bit Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1461:0	DMC RxPDO-Par Outputs 32 Bit Ch.1	PDO Parameter RxPDO 98	UINT8	RO	0x06 (6_{dec}))
1461:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 98	OCTET-STRING[2]	RO	60 16

Index 14E0 DMC RxPDO-Par Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
14E0:0	DMC RxPDO-Par Outputs Ch.2	PDO Parameter RxPDO 225	UINT8	RO	0x06 (6_{dec}))
14E0:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 225	OCTET-STRING[2]	RO	E1 16

Index 14E1 DMC RxPDO-Par Outputs 32 Bit Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
14E1:0	DMC RxPDO-Par Outputs 32 Bit Ch.2	PDO Parameter RxPDO 226	UINT8	RO	0x06 (6_{dec}))
14E1:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 226	OCTET-STRING[2]	RO	E0 16

Index 1600 DRV RxPDO-Map Controlword Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1600:0	DRV RxPDO-Map Controlword Ch.1	PDO Mapping RxPDO 1	UINT8	RO	0x01 (1_{dec}))
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x01 (Controlword))	UINT32	RO	0x7010:01, 16

Index 1601 DRV RxPDO-Map Target velocity Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1601:0	DRV RxPDO-Map Target velocity Ch.1	PDO Mapping RxPDO 2	UINT8	RO	0x01 (1_{dec}))
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x06 (Target velocity))	UINT32	RO	0x7010:06, 32

Index 1602 DRV RxPDO-Map Target torque Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1602:0	DRV RxPDO-Map Target torque Ch.1	PDO Mapping RxPDO 3	UINT8	RO	0x01 (1_{dec}))
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x09 (Target torque))	UINT32	RO	0x7010:09, 16

Index 1603 DRV RxPDO-Map Commutation angle Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1603:0	DRV RxPDO-Map Commutation angle Ch.1	PDO Mapping RxPDO 4	UINT8	RO	0x01 (1_{dec}))
1603:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x0E (Commutation angle))	UINT32	RO	0x7010:0E, 16

Index 1604 DRV RxPDO-Map Torque limitation Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1604:0	DRV RxPDO-Map Torque limitation Ch.1	PDO Mapping RxPDO 5	UINT8	RO	0x01 (1_{dec}))
1604:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x0B (Torque limitation))	UINT32	RO	0x7010:0B, 16

Index 1605 DRV RxPDO-Map Torque offset Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1605:0	DRV RxPDO-Map Torque offset Ch.1	PDO Mapping RxPDO 6	UINT8	RO	0x01 (1_{dec}))
1605:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x0A (Torque offset))	UINT32	RO	0x7010:0A, 16

Index 1606 DRV RxPDO-Map Target position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1606:0	DRV RxPDO-Map Target position Ch.1	PDO Mapping RxPDO 7	UINT8	RO	0x01 (1_{dec}))
1606:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x05 (Target position))	UINT32	RO	0x7010:05, 32

Index 1607 FB RxPDO-Map Touch probe control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1607:0	FB RxPDO-Map Touch probe control Ch.1	PDO Mapping RxPDO 8	UINT8	RO	0x0C (12_{dec}))
1607:01	SubIndex 001	1. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x01 (TP1 Enable))	UINT32	RO	0x7001:01, 1
1607:02	SubIndex 002	2. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x02 (TP1 Continous))	UINT32	RO	0x7001:02, 1
1607:03	SubIndex 003	3. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x03 (TP1 Trigger mode))	UINT32	RO	0x7001:03, 2
1607:04	SubIndex 004	4. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x05 (TP1 Enable pos edge))	UINT32	RO	0x7001:05, 1
1607:05	SubIndex 005	5. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x06 (TP1 Enable neg edge))	UINT32	RO	0x7001:06, 1
1607:06	SubIndex 006	6. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1607:07	SubIndex 007	7. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x09 (TP2 Enable))	UINT32	RO	0x7001:09, 1
1607:08	SubIndex 008	8. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x0A (TP2 Continous))	UINT32	RO	0x7001:0A, 1
1607:09	SubIndex 009	9. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x0B (TP2 Trigger mode))	UINT32	RO	0x7001:0B, 2
1607:0A	SubIndex 010	10. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x0D (TP2 Enable pos edge))	UINT32	RO	0x7001:0D, 1
1607:0B	SubIndex 011	11. PDO Mapping entry (object 0x7001 (FB Touch probe outputs Ch.1), entry 0x0E (TP2 Enable neg edge))	UINT32	RO	0x7001:0E, 1
1607:0C	SubIndex 012	12. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2

Index 1608 DRV RxPDO-Map Modes of operation Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1608:0	DRV RxPDO-Map Modes of operation Ch.1	PDO Mapping RxPDO 9	UINT8	RO	0x01 (1_{dec}))
1608:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x03 (Modes of operation))	UINT32	RO	0x7010:03, 8

Index 1609 DRV RxPDO-Map Velocity offset Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1609:0	DRV RxPDO-Map Velocity offset Ch.1	PDO Mapping RxPDO 10	UINT8	RO	0x01 (1_{dec}))
1609:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x0F (Velocity offset))	UINT32	RO	0x7010:0F, 32

Index 160A DRV RxPDO-Map Positive torque limit value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
160A:0	DRV RxPDO-Map Positive torque limit value Ch.1	PDO Mapping RxPDO 11	UINT8	RO	0x01 (1_{dec}))
160A:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x10 (Positive torque limit value))	UINT32	RO	0x7010:10, 16

Index 160B DRV RxPDO-Map Negative torque limit value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
160B:0	DRV RxPDO-Map Negative torque limit value Ch.1	PDO Mapping RxPDO 12	UINT8	RO	0x01 (1_{dec}))
160B:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x11 (Negative torque limit value))	UINT32	RO	0x7010:11, 16

Index 160C DRV RxPDO-Map Low velocity limit value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
160C:0	DRV RxPDO-Map Low velocity limit value Ch.1	PDO Mapping RxPDO 13	UINT8	RO	0x01 (1_{dec}))
160C:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x12 (Low velocity limit value))	UINT32	RO	0x7010:12, 32

Index 160D DRV RxPDO-Map High velocity limit value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
160D:0	DRV RxPDO-Map High velocity limit value Ch.1	PDO Mapping RxPDO 14	UINT8	RO	0x01 (1_{dec}))
160D:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DRV Outputs Ch.1), entry 0x13 (High velocity limit value))	UINT32	RO	0x7010:13, 32

Index 1660 DMC RxPDO-Map Outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1660:0	DMC RxPDO-Map Outputs Ch.1	PDO Mapping RxPDO 97	UINT8	RO	0x12 (18_{dec}))
1660:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1660:02	SubIndex 002	2. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x02 (DMC__FeedbackControl__Enable latch extern on positive edge))	UINT32	RO	0x7060:02, 1
1660:03	SubIndex 003	3. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x03 (DMC__FeedbackControl__Set counter))	UINT32	RO	0x7060:03, 1
1660:04	SubIndex 004	4. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x04 (DMC__FeedbackControl__Enable latch extern on negative edge))	UINT32	RO	0x7060:04, 1
1660:05	SubIndex 005	5. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
1660:06	SubIndex 006	6. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x11 (DMC__DriveControl__Enable))	UINT32	RO	0x7060:11, 1
1660:07	SubIndex 007	7. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x12 (DMC__DriveControl__Reset))	UINT32	RO	0x7060:12, 1
1660:08	SubIndex 008	8. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
1660:09	SubIndex 009	9. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x21 (DMC__PositioningControl__Execute))	UINT32	RO	0x7060:21, 1
1660:0A	SubIndex 010	10. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x22 (DMC__PositioningControl__Emergency stop))	UINT32	RO	0x7060:22, 1
1660:0B	SubIndex 011	11. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
1660:0C	SubIndex 012	12. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x31 (DMC__Set counter value))	UINT32	RO	0x7060:31, 64
1660:0D	SubIndex 013	13. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x32 (DMC__Target position))	UINT32	RO	0x7060:32, 64
1660:0E	SubIndex 014	14. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x33 (DMC__Target velocity))	UINT32	RO	0x7060:33, 16
1660:0F	SubIndex 015	15. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x34 (DMC__Start type))	UINT32	RO	0x7060:34, 16
1660:10	SubIndex 016	16. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x35 (DMC__Target acceleration))	UINT32	RO	0x7060:35, 16
1660:11	SubIndex 017	17. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x36 (DMC__Target deceleration))	UINT32	RO	0x7060:36, 16
1660:12	SubIndex 018	18. PDO Mapping entry (80 bits align)	UINT32	RO	0x0000:00, 80

Index 1661 DMC RxPDO-Map Outputs 32 Bit Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1661:0	DMC RxPDO-Map Outputs 32 Bit Ch.1	PDO Mapping RxPDO 98	UINT8	RO	0x14 (20_{dec}))
1661:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1661:02	SubIndex 002	2. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x02 (DMC__FeedbackControl__Enable latch extern on positive edge))	UINT32	RO	0x7060:02, 1
1661:03	SubIndex 003	3. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x03 (DMC__FeedbackControl__Set counter))	UINT32	RO	0x7060:03, 1
1661:04	SubIndex 004	4. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x04 (DMC__FeedbackControl__Enable latch extern on negative edge))	UINT32	RO	0x7060:04, 1
1661:05	SubIndex 005	5. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
1661:06	SubIndex 006	6. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x11 (DMC__DriveControl__Enable))	UINT32	RO	0x7060:11, 1
1661:07	SubIndex 007	7. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x12 (DMC__DriveControl__Reset))	UINT32	RO	0x7060:12, 1
1661:08	SubIndex 008	8. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
1661:09	SubIndex 009	9. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x21 (DMC__PositioningControl__Execute))	UINT32	RO	0x7060:21, 1
1661:0A	SubIndex 010	10. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x22 (DMC__PositioningControl__Emergency stop))	UINT32	RO	0x7060:22, 1
1661:0B	SubIndex 011	11. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
1661:0C	SubIndex 012	12. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x31 (DMC__Set counter value))	UINT32	RO	0x7060:31, 32
1661:0D	SubIndex 013	13. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1661:0E	SubIndex 014	14. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x32 (DMC__Target position))	UINT32	RO	0x7060:32, 32
1661:0F	SubIndex 015	15. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1661:10	SubIndex 016	16. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x33 (DMC__Target velocity))	UINT32	RO	0x7060:33, 16
1661:11	SubIndex 017	17. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x34 (DMC__Start type))	UINT32	RO	0x7060:34, 16
1661:12	SubIndex 018	18. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x35 (DMC__Target acceleration))	UINT32	RO	0x7060:35, 16
1661:13	SubIndex 019	19. PDO Mapping entry (object 0x7060 (DMC Outputs Ch.1), entry 0x36 (DMC__Target deceleration))	UINT32	RO	0x7060:36, 16
1661:14	SubIndex 020	20. PDO Mapping entry (80 bits align)	UINT32	RO	0x0000:00, 80

Index 1680 DRV RxPDO-Map Controlword Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1680:0	DRV RxPDO-Map Controlword Ch.2	PDO Mapping RxPDO 129	UINT8	RO	0x01 (1_{dec}))
1680:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x01 (Controlword))	UINT32	RO	0x7110:01, 16

Index 1681 DRV RxPDO-Map Target velocity Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1681:0	DRV RxPDO-Map Target velocity Ch.2	PDO Mapping RxPDO 130	UINT8	RO	0x01 (1_{dec}))
1681:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x06 (Target velocity))	UINT32	RO	0x7110:06, 32

Index 1682 DRV RxPDO-Map Target torque Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1682:0	DRV RxPDO-Map Target torque Ch.2	PDO Mapping RxPDO 131	UINT8	RO	0x01 (1_{dec}))
1682:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x09 (Target torque))	UINT32	RO	0x7110:09, 16

Index 1683 DRV RxPDO-Map Commutation angle Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1683:0	DRV RxPDO-Map Commutation angle Ch.2	PDO Mapping RxPDO 132	UINT8	RO	0x01 (1_{dec}))
1683:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x0E (Commutation angle))	UINT32	RO	0x7110:0E, 16

Index 1684 DRV RxPDO-Map Torque limitation Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1684:0	DRV RxPDO-Map Torque limitation Ch.2	PDO Mapping RxPDO 133	UINT8	RO	0x01 (1_{dec}))
1684:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x0B (Torque limitation))	UINT32	RO	0x7110:0B, 16

Index 1685 DRV RxPDO-Map Torque offset Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1685:0	DRV RxPDO-Map Torque offset Ch.2	PDO Mapping RxPDO 134	UINT8	RO	0x01 (1_{dec}))
1685:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x0A (Torque offset))	UINT32	RO	0x7110:0A, 16

Index 1686 DRV RxPDO-Map Target position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1686:0	DRV RxPDO-Map Target position Ch.2	PDO Mapping RxPDO 135	UINT8	RO	0x01 (1_{dec}))
1686:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x05 (Target position))	UINT32	RO	0x7110:05, 32

Index 1687 FB RxPDO-Map Touch probe control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1687:0	FB RxPDO-Map Touch probe control Ch.2	PDO Mapping RxPDO 136	UINT8	RO	0x0C (12_{dec}))
1687:01	SubIndex 001	1. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x01 (TP1 Enable))	UINT32	RO	0x7101:01, 1
1687:02	SubIndex 002	2. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x02 (TP1 Continous))	UINT32	RO	0x7101:02, 1
1687:03	SubIndex 003	3. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x03 (TP1 Trigger mode))	UINT32	RO	0x7101:03, 2
1687:04	SubIndex 004	4. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x05 (TP1 Enable pos edge))	UINT32	RO	0x7101:05, 1
1687:05	SubIndex 005	5. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x06 (TP1 Enable neg edge))	UINT32	RO	0x7101:06, 1
1687:06	SubIndex 006	6. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1687:07	SubIndex 007	7. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x09 (TP2 Enable))	UINT32	RO	0x7101:09, 1
1687:08	SubIndex 008	8. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x0A (TP2 Continous))	UINT32	RO	0x7101:0A, 1
1687:09	SubIndex 009	9. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x0B (TP2 Trigger mode))	UINT32	RO	0x7101:0B, 2
1687:0A	SubIndex 010	10. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x0D (TP2 Enable pos edge))	UINT32	RO	0x7101:0D, 1
1687:0B	SubIndex 011	11. PDO Mapping entry (object 0x7101 (FB Touch probe outputs Ch.2), entry 0x0E (TP2 Enable neg edge))	UINT32	RO	0x7101:0E, 1
1687:0C	SubIndex 012	12. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2

Index 1688 DRV RxPDO-Map Modes of operation Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1688:0	DRV RxPDO-Map Modes of operation Ch.2	PDO Mapping RxPDO 137	UINT8	RO	0x01 (1_{dec}))
1688:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x03 (Modes of operation))	UINT32	RO	0x7110:03, 8

Index 1689 DRV RxPDO-Map Velocity offset Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1689:0	DRV RxPDO-Map Velocity offset Ch.2	PDO Mapping RxPDO 138	UINT8	RO	0x01 (1_{dec}))
1689:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x0F (Velocity offset))	UINT32	RO	0x7110:0F, 32

Index 168A DRV RxPDO-Map Positive torque limit value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
168A:0	DRV RxPDO-Map Positive torque limit value Ch.2	PDO Mapping RxPDO 139	UINT8	RO	0x01 (1_{dec}))
168A:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x10 (Positive torque limit value))	UINT32	RO	0x7110:10, 16

Index 168B DRV RxPDO-Map Negative torque limit value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
168B:0	DRV RxPDO-Map Negative torque limit value Ch.2	PDO Mapping RxPDO 140	UINT8	RO	0x01 (1_{dec}))
168B:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x11 (Negative torque limit value))	UINT32	RO	0x7110:11, 16

Index 168C DRV RxPDO-Map Low velocity limit value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
168C:0	DRV RxPDO-Map Low velocity limit value Ch.2	PDO Mapping RxPDO 141	UINT8	RO	0x01 (1_{dec}))
168C:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x12 (Low velocity limit value))	UINT32	RO	0x7110:12, 32

Index 168D DRV RxPDO-Map High velocity limit value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
168D:0	DRV RxPDO-Map High velocity limit value Ch.2	PDO Mapping RxPDO 142	UINT8	RO	0x01 (1_{dec}))
168D:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (DRV Outputs Ch.2), entry 0x13 (High velocity limit value))	UINT32	RO	0x7110:13, 32

Index 16E0 DMC RxPDO-Map Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
16E0:0	DMC RxPDO-Map Outputs Ch.2	PDO Mapping RxPDO 225	UINT8	RO	0x12 (18_{dec}))
16E0:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
16E0:02	SubIndex 002	2. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x02 (DMC__FeedbackControl__Enable latch extern on positive edge))	UINT32	RO	0x7160:02, 1
16E0:03	SubIndex 003	3. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x03 (DMC__FeedbackControl__Set counter))	UINT32	RO	0x7160:03, 1
16E0:04	SubIndex 004	4. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x04 (DMC__FeedbackControl__Enable latch extern on negative edge))	UINT32	RO	0x7160:04, 1
16E0:05	SubIndex 005	5. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
16E0:06	SubIndex 006	6. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x11 (DMC__DriveControl__Enable))	UINT32	RO	0x7160:11, 1
16E0:07	SubIndex 007	7. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x12 (DMC__DriveControl__Reset))	UINT32	RO	0x7160:12, 1
16E0:08	SubIndex 008	8. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
16E0:09	SubIndex 009	9. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x21 (DMC__PositioningControl__Execute))	UINT32	RO	0x7160:21, 1
16E0:0A	SubIndex 010	10. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x22 (DMC__PositioningControl__Emergency stop))	UINT32	RO	0x7160:22, 1
16E0:0B	SubIndex 011	11. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
16E0:0C	SubIndex 012	12. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x31 (DMC__Set counter value))	UINT32	RO	0x7160:31, 64
16E0:0D	SubIndex 013	13. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x32 (DMC__Target position))	UINT32	RO	0x7160:32, 64
16E0:0E	SubIndex 014	14. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x33 (DMC__Target velocity))	UINT32	RO	0x7160:33, 16
16E0:0F	SubIndex 015	15. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x34 (DMC__Start type))	UINT32	RO	0x7160:34, 16
16E0:10	SubIndex 016	16. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x35 (DMC__Target acceleration))	UINT32	RO	0x7160:35, 16
16E0:11	SubIndex 017	17. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x36 (DMC__Target deceleration))	UINT32	RO	0x7160:36, 16
16E0:12	SubIndex 018	18. PDO Mapping entry (80 bits align)	UINT32	RO	0x0000:00, 80

Index 16E1 DMC RxPDO-Map Outputs 32 Bit Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
16E1:0	DMC RxPDO-Map Outputs 32 Bit Ch.2	PDO Mapping RxPDO 226	UINT8	RO	0x14 (20_{dec}))
16E1:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
16E1:02	SubIndex 002	2. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x02 (DMC__FeedbackControl__Enable latch extern on positive edge))	UINT32	RO	0x7160:02, 1
16E1:03	SubIndex 003	3. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x03 (DMC__FeedbackControl__Set counter))	UINT32	RO	0x7160:03, 1
16E1:04	SubIndex 004	4. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x04 (DMC__FeedbackControl__Enable latch extern on negative edge))	UINT32	RO	0x7160:04, 1
16E1:05	SubIndex 005	5. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
16E1:06	SubIndex 006	6. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x11 (DMC__DriveControl__Enable))	UINT32	RO	0x7160:11, 1
16E1:07	SubIndex 007	7. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x12 (DMC__DriveControl__Reset))	UINT32	RO	0x7160:12, 1
16E1:08	SubIndex 008	8. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
16E1:09	SubIndex 009	9. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x21 (DMC__PositioningControl__Execute))	UINT32	RO	0x7160:21, 1
16E1:0A	SubIndex 010	10. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x22 (DMC__PositioningControl__Emergency stop))	UINT32	RO	0x7160:22, 1
16E1:0B	SubIndex 011	11. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14
16E1:0C	SubIndex 012	12. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x31 (DMC__Set counter value))	UINT32	RO	0x7160:31, 32
16E1:0D	SubIndex 013	13. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
16E1:0E	SubIndex 014	14. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x32 (DMC__Target position))	UINT32	RO	0x7160:32, 32
16E1:0F	SubIndex 015	15. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
16E1:10	SubIndex 016	16. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x33 (DMC__Target velocity))	UINT32	RO	0x7160:33, 16
16E1:11	SubIndex 017	17. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x34 (DMC__Start type))	UINT32	RO	0x7160:34, 16
16E1:12	SubIndex 018	18. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x35 (DMC__Target acceleration))	UINT32	RO	0x7160:35, 16
16E1:13	SubIndex 019	19. PDO Mapping entry (object 0x7160 (DMC Outputs Ch.2), entry 0x36 (DMC__Target deceleration))	UINT32	RO	0x7160:36, 16
16E1:14	SubIndex 020	20. PDO Mapping entry (80 bits align)	UINT32	RO	0x0000:00, 80

Index 1860 DMC TxPDO-Par Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1860:0	DMC TxPDO-Par Inputs Ch.1	PDO parameter TxPDO 97	UINT8	RO	0x06 (6_{dec}))
1860:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 97	OCTET-STRING[2]	RO	61 1A

Index 1861 DMC TxPDO-Par Inputs 32 Bit Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1861:0	DMC TxPDO-Par Inputs 32 Bit Ch.1	PDO parameter TxPDO 98	UINT8	RO	0x06 (6_{dec}))
1861:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 98	OCTET-STRING[2]	RO	60 1A

Index 18E0 DMC TxPDO-Par Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
18E0:0	DMC TxPDO-Par Inputs Ch.2	PDO parameter TxPDO 225	UINT8	RO	0x06 (6_{dec}))
18E0:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 225	OCTET-STRING[2]	RO	E1 1A

Index 18E1 DMC TxPDO-Par Inputs 32 Bit Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
18E1:0	DMC TxPDO-Par Inputs 32 Bit Ch.2	PDO parameter TxPDO 226	UINT8	RO	0x06 (6_{dec}))
18E1:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 226	OCTET-STRING[2]	RO	E0 1A

Index 1A00 FB TxPDO-Map Position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	FB TxPDO-Map Position Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x01 (1_{dec}))
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (FB Inputs Ch.1), entry 0x11 (Position))	UINT32	RO	0x6000:11, 32

Index 1A01 DRV TxPDO-Map Statusword Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	DRV TxPDO-Map Statusword Ch.1	PDO Mapping TxPDO 2	UINT8	RO	0x01 (1_{dec}))
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x01 (Statusword))	UINT32	RO	0x6010:01, 16

Index 1A02 DRV TxPDO-Map Velocity actual value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	DRV TxPDO-Map Velocity actual value Ch.1	PDO Mapping TxPDO 3	UINT8	RO	0x01 (1_{dec}))
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x07 (Velocity actual value))	UINT32	RO	0x6010:07, 32

Index 1A03 DRV TxPDO-Map Torque actual value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	DRV TxPDO-Map Torque actual value Ch.1	PDO Mapping TxPDO 4	UINT8	RO	0x01 (1_{dec}))
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x08 (Torque actual value))	UINT32	RO	0x6010:08, 16

Index 1A04 DRV TxPDO-Map Info data 1 Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	DRV TxPDO-Map Info data 1 Ch.1	PDO Mapping TxPDO 5	UINT8	RW	0x01 (1_{dec}))
1A04:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x12 (Info data 1))	UINT32	RW	0x6010:12, 16
1A04:02	SubIndex 002	2. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:03	SubIndex 003	3. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:04	SubIndex 004	4. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:05	SubIndex 005	5. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:06	SubIndex 006	6. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:07	SubIndex 007	7. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:08	SubIndex 008	8. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:09	SubIndex 009	9. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:0A	SubIndex 010	10. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:0B	SubIndex 011	11. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:0C	SubIndex 012	12. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:0D	SubIndex 013	13. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:0E	SubIndex 014	14. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:0F	SubIndex 015	15. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A04:10	SubIndex 016	16. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0

Index 1A05 DRV TxPDO-Map Info data 2 Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A05:0	DRV TxPDO-Map Info data 2 Ch.1	PDO Mapping TxPDO 6	UINT8	RW	0x01 (1_{dec}))
1A05:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x13 (Info data 2))	UINT32	RW	0x6010:13, 16
1A05:02	SubIndex 002	2. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:03	SubIndex 003	3. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:04	SubIndex 004	4. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:05	SubIndex 005	5. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:06	SubIndex 006	6. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:07	SubIndex 007	7. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:08	SubIndex 008	8. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:09	SubIndex 009	9. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:0A	SubIndex 010	10. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:0B	SubIndex 011	11. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:0C	SubIndex 012	12. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:0D	SubIndex 013	13. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:0E	SubIndex 014	14. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:0F	SubIndex 015	15. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A05:10	SubIndex 016	16. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0

Index 1A06 DRV TxPDO-Map Following error actual value Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A06:0	DRV TxPDO-Map Following error actual value Ch.1	PDO Mapping TxPDO 7	UINT8	RO	0x01 (1_{dec}))
1A06:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x06 (Following error actual value))	UINT32	RO	0x6010:06, 32

Index 1A07 FB TxPDO-Map Touch probe status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A07:0	FB TxPDO-Map Touch probe status Ch.1	PDO Mapping TxPDO 8	UINT8	RO	0x0A (10_{dec}))
1A07:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x01 (TP1 Enable))	UINT32	RO	0x6001:01, 1
1A07:02	SubIndex 002	2. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x02 (TP1 Pos value stored))	UINT32	RO	0x6001:02, 1
1A07:03	SubIndex 003	3. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x03 (TP1 Neg value stored))	UINT32	RO	0x6001:03, 1
1A07:04	SubIndex 004	4. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A07:05	SubIndex 005	5. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x08 (TP1 Input))	UINT32	RO	0x6001:08, 1
1A07:06	SubIndex 006	6. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x09 (TP2 Enable))	UINT32	RO	0x6001:09, 1
1A07:07	SubIndex 007	7. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x0A (TP2 Pos value stored))	UINT32	RO	0x6001:0A, 1
1A07:08	SubIndex 008	8. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x0B (TP2 Neg value stored))	UINT32	RO	0x6001:0B, 1
1A07:09	SubIndex 009	9. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A07:0A	SubIndex 010	10. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x10 (TP2 Input))	UINT32	RO	0x6001:10, 1

Index 1A08 FB TxPDO-Map Touch probe 1 pos position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A08:0	FB TxPDO-Map Touch probe 1 pos position Ch.1	PDO Mapping TxPDO 9	UINT8	RO	0x01 (1_{dec}))
1A08:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x11 (TP1 Pos position))	UINT32	RO	0x6001:11, 32

Index 1A09 FB TxPDO-Map Touch probe 1 neg position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A09:0	FB TxPDO-Map Touch probe 1 neg position Ch.1	PDO Mapping TxPDO 10	UINT8	RO	0x01 (1_{dec}))
1A09:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x12 (TP1 Neg position))	UINT32	RO	0x6001:12, 32

Index 1A0A FB TxPDO-Map Touch probe 2 pos position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0A:0	FB TxPDO-Map Touch probe 2 pos position Ch.1	PDO Mapping TxPDO 11	UINT8	RO	0x01 (1_{dec}))
1A0A:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x13 (TP2 Pos position))	UINT32	RO	0x6001:13, 32

Index 1A0B FB TxPDO-Map Touch probe 2 neg position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0B:0	FB TxPDO-Map Touch probe 2 neg position Ch.1	PDO Mapping TxPDO 12	UINT8	RO	0x01 (1_{dec}))
1A0B:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x14 (TP2 Neg position))	UINT32	RO	0x6001:14, 32

Index 1A0D DRV TxPDO-Map Info data 3 Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0D:0	DRV TxPDO-Map Info data 3 Ch.1	PDO Mapping TxPDO 14	UINT8	RW	0x01 (1_{dec}))
1A0D:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x14 (Info data 3))	UINT32	RW	0x6010:14, 16
1A0D:02	SubIndex 002	2. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:03	SubIndex 003	3. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:04	SubIndex 004	4. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:05	SubIndex 005	5. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:06	SubIndex 006	6. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:07	SubIndex 007	7. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:08	SubIndex 008	8. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:09	SubIndex 009	9. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:0A	SubIndex 010	10. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:0B	SubIndex 011	11. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:0C	SubIndex 012	12. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:0D	SubIndex 013	13. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:0E	SubIndex 014	14. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:0F	SubIndex 015	15. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A0D:10	SubIndex 016	16. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0

Index 1A0E DRV TxPDO-Map Modes of operation display Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0E:0	DRV TxPDO-Map Modes of operation display Ch.1	PDO Mapping TxPDO 15	UINT8	RO	0x01 (1_{dec}))
1A0E:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x03 (Modes of operation display))	UINT32	RO	0x6010:03, 8

Index 1A0F DRV TxPDO-Map Torque limitation status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0F:0	DRV TxPDO-Map Torque limitation status Ch.1	PDO Mapping TxPDO 16	UINT8	RO	0x01 (1_{dec}))
1A0F:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DRV Inputs Ch.1), entry 0x15 (Torque limitation status))	UINT32	RO	0x6010:15, 8

Index 1A10 DI TxPDO-Map Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A10:0	DI TxPDO-Map Inputs Ch.1	PDO Mapping TxPDO 17	UINT8	RO	0x07 (7_{dec}))
1A10:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (DI Inputs Ch.1), entry 0x01 (Input 1))	UINT32	RO	0x6020:01, 1
1A10:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (DI Inputs Ch.1), entry 0x02 (Input 2))	UINT32	RO	0x6020:02, 1
1A10:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A10:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (DI Inputs Ch.1), entry 0x05 (Encoder A))	UINT32	RO	0x6020:05, 1
1A10:05	SubIndex 005	5. PDO Mapping entry (object 0x6020 (DI Inputs Ch.1), entry 0x06 (Encoder B))	UINT32	RO	0x6020:06, 1
1A10:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (DI Inputs Ch.1), entry 0x07 (Encoder C))	UINT32	RO	0x6020:07, 1
1A10:07	SubIndex 007	7. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9

Index 1A11 FB TxPDO-Map Touch probe 1 pos timestamp Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A11:0	FB TxPDO-Map Touch probe 1 pos timestamp Ch.1	PDO Mapping TxPDO 18	UINT8	RO	0x01 (1_{dec}))
1A11:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x15 (TP1 Pos timestamp))	UINT32	RO	0x6001:15, 32

Index 1A12 FB TxPDO-Map Touch probe 1 neg timestamp Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A12:0	FB TxPDO-Map Touch probe 1 neg timestamp Ch.1	PDO Mapping TxPDO 19	UINT8	RO	0x01 (1_{dec}))
1A12:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x16 (TP1 Neg timestamp))	UINT32	RO	0x6001:16, 32

Index 1A13 FB TxPDO-Map Touch probe 2 pos timestamp Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A13:0	FB TxPDO-Map Touch probe 2 pos timestamp Ch.1	PDO Mapping TxPDO 20	UINT8	RO	0x01 (1_{dec}))
1A13:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x17 (TP2 Pos timestamp))	UINT32	RO	0x6001:17, 32

Index 1A14 FB TxPDO-Map Touch probe 2 neg timestamp Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A14:0	FB TxPDO-Map Touch probe 2 neg timestamp Ch.1	PDO Mapping TxPDO 21	UINT8	RO	0x01 (1_{dec}))
1A14:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (FB Touch probe inputs Ch.1), entry 0x18 (TP2 Neg timestamp))	UINT32	RO	0x6001:18, 32

Index 1A15 FB TxPDO-Map Secondary Position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A15:0	FB TxPDO-Map Secondary Position Ch.1	PDO Mapping TxPDO 22	UINT8	RO	0x01 (1_{dec}))
1A15:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (FB Inputs Ch.1), entry 0x15 (Secondary position))	UINT32	RO	0x6000:15, 32

Index 1A60 DMC TxPDO-Map Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A60:0	DMC TxPDO-Map Inputs Ch.1	PDO Mapping TxPDO 97	UINT8	RO	0x26 (38_{dec}))
1A60:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A60:02	SubIndex 002	2. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x02 (DMC__FeedbackStatus__Latch extern valid))	UINT32	RO	0x6060:02, 1
1A60:03	SubIndex 003	3. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x03 (DMC__FeedbackStatus__Set counter done))	UINT32	RO	0x6060:03, 1
1A60:04	SubIndex 004	4. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A60:05	SubIndex 005	5. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x0D (DMC__FeedbackStatus__Status of extern latch))	UINT32	RO	0x6060:0D, 1
1A60:06	SubIndex 006	6. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1A60:07	SubIndex 007	7. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x11 (DMC__DriveStatus__Ready to enable))	UINT32	RO	0x6060:11, 1
1A60:08	SubIndex 008	8. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x12 (DMC__DriveStatus__Ready))	UINT32	RO	0x6060:12, 1
1A60:09	SubIndex 009	9. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x13 (DMC__DriveStatus__Warning))	UINT32	RO	0x6060:13, 1
1A60:0A	SubIndex 010	10. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x14 (DMC__DriveStatus__Error))	UINT32	RO	0x6060:14, 1
1A60:0B	SubIndex 011	11. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x15 (DMC__DriveStatus__Moving positive))	UINT32	RO	0x6060:15, 1
1A60:0C	SubIndex 012	12. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x16 (DMC__DriveStatus__Moving negative))	UINT32	RO	0x6060:16, 1
1A60:0D	SubIndex 013	13. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1A60:0E	SubIndex 014	14. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x1C (DMC__DriveStatus__Digital input 1))	UINT32	RO	0x6060:1C, 1
1A60:0F	SubIndex 015	15. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x1D (DMC__DriveStatus__Digital input 2))	UINT32	RO	0x6060:1D, 1
1A60:10	SubIndex 016	16. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1A60:11	SubIndex 017	17. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x21 (DMC__PositioningStatus__Busy))	UINT32	RO	0x6060:21, 1
1A60:12	SubIndex 018	18. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x22 (DMC__PositioningStatus__In-Target))	UINT32	RO	0x6060:22, 1
1A60:13	SubIndex 019	19. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x23 (DMC__PositioningStatus__Warning))	UINT32	RO	0x6060:23, 1
1A60:14	SubIndex 020	20. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x24 (DMC__PositioningStatus__Error))	UINT32	RO	0x6060:24, 1
1A60:15	SubIndex 021	21. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x25 (DMC__PositioningStatus__Calibrated))	UINT32	RO	0x6060:25, 1
1A60:16	SubIndex 022	22. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x26 (DMC__PositioningStatus__Accelerate))	UINT32	RO	0x6060:26, 1
1A60:17	SubIndex 023	23. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x27 (DMC__PositioningStatus__Decelerate))	UINT32	RO	0x6060:27, 1
1A60:18	SubIndex 024	24. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x28 (DMC__PositioningStatus__Ready to execute))	UINT32	RO	0x6060:28, 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A60:19	SubIndex 025	25. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1A60:1A	SubIndex 026	26. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x31 (DMC__Set position))	UINT32	RO	0x6060:31, 64
1A60:1B	SubIndex 027	27. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x32 (DMC__Set velocity))	UINT32	RO	0x6060:32, 16
1A60:1C	SubIndex 028	28. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x33 (DMC__Actual drive time))	UINT32	RO	0x6060:33, 32
1A60:1D	SubIndex 029	29. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x34 (DMC__Actual position lag))	UINT32	RO	0x6060:34, 64
1A60:1E	SubIndex 030	30. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x35 (DMC__Actual velocity))	UINT32	RO	0x6060:35, 16
1A60:1F	SubIndex 031	31. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x36 (DMC__Actual position))	UINT32	RO	0x6060:36, 64
1A60:20	SubIndex 032	32. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x37 (DMC__Error id))	UINT32	RO	0x6060:37, 32
1A60:21	SubIndex 033	33. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x38 (DMC__Input cycle counter))	UINT32	RO	0x6060:38, 8
1A60:22	SubIndex 034	34. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x39 (DMC__Channel id))	UINT32	RO	0x6060:39, 8
1A60:23	SubIndex 035	35. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x3A (DMC__Latch value))	UINT32	RO	0x6060:3A, 64
1A60:24	SubIndex 036	36. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x3B (DMC__Cyclic info data 1))	UINT32	RO	0x6060:3B, 16
1A60:25	SubIndex 037	37. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x3C (DMC__Cyclic info data 2))	UINT32	RO	0x6060:3C, 16
1A60:26	SubIndex 038	38. PDO Mapping entry (64 bits align)	UINT32	RO	0x0000:00, 64

Index 1A61 DMC TxPDO-Map Inputs 32 Bit Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A61:0	DMC TxPDO-Map Inputs 32 Bit Ch.1	PDO Mapping TxPDO 98	UINT8	RO	0x2A (42_{dec}))
1A61:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A61:02	SubIndex 002	2. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x02 (DMC__FeedbackStatus__Latch extern valid))	UINT32	RO	0x6060:02, 1
1A61:03	SubIndex 003	3. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x03 (DMC__FeedbackStatus__Set counter done))	UINT32	RO	0x6060:03, 1
1A61:04	SubIndex 004	4. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A61:05	SubIndex 005	5. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x0D (DMC__FeedbackStatus__Status of extern latch))	UINT32	RO	0x6060:0D, 1
1A61:06	SubIndex 006	6. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1A61:07	SubIndex 007	7. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x11 (DMC__DriveStatus__Ready to enable))	UINT32	RO	0x6060:11, 1
1A61:08	SubIndex 008	8. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x12 (DMC__DriveStatus__Ready))	UINT32	RO	0x6060:12, 1
1A61:09	SubIndex 009	9. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x13 (DMC__DriveStatus__Warning))	UINT32	RO	0x6060:13, 1
1A61:0A	SubIndex 010	10. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x14 (DMC__DriveStatus__Error))	UINT32	RO	0x6060:14, 1
1A61:0B	SubIndex 011	11. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x15 (DMC__DriveStatus__Moving positive))	UINT32	RO	0x6060:15, 1
1A61:0C	SubIndex 012	12. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x16 (DMC__DriveStatus__Moving negative))	UINT32	RO	0x6060:16, 1
1A61:0D	SubIndex 013	13. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1A61:0E	SubIndex 014	14. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x1C (DMC__DriveStatus__Digital input 1))	UINT32	RO	0x6060:1C, 1
1A61:0F	SubIndex 015	15. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x1D (DMC__DriveStatus__Digital input 2))	UINT32	RO	0x6060:1D, 1
1A61:10	SubIndex 016	16. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1A61:11	SubIndex 017	17. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x21 (DMC__PositioningStatus__Busy))	UINT32	RO	0x6060:21, 1
1A61:12	SubIndex 018	18. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x22 (DMC__PositioningStatus__In-Target))	UINT32	RO	0x6060:22, 1
1A61:13	SubIndex 019	19. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x23 (DMC__PositioningStatus__Warning))	UINT32	RO	0x6060:23, 1
1A61:14	SubIndex 020	20. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x24 (DMC__PositioningStatus__Error))	UINT32	RO	0x6060:24, 1
1A61:15	SubIndex 021	21. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x25 (DMC__PositioningStatus__Calibrated))	UINT32	RO	0x6060:25, 1
1A61:16	SubIndex 022	22. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x26 (DMC__PositioningStatus__Accelerate))	UINT32	RO	0x6060:26, 1
1A61:17	SubIndex 023	23. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x27 (DMC__PositioningStatus__Decelerate))	UINT32	RO	0x6060:27, 1
1A61:18	SubIndex 024	24. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x28 (DMC__PositioningStatus__Ready to execute))	UINT32	RO	0x6060:28, 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A61:19	SubIndex 025	25. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1A61:1A	SubIndex 026	26. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x31 (DMC__Set position))	UINT32	RO	0x6060:31, 32
1A61:1B	SubIndex 027	27. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1A61:1C	SubIndex 028	28. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x32 (DMC__Set velocity))	UINT32	RO	0x6060:32, 16
1A61:1D	SubIndex 029	29. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x33 (DMC__Actual drive time))	UINT32	RO	0x6060:33, 32
1A61:1E	SubIndex 030	30. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x34 (DMC__Actual position lag))	UINT32	RO	0x6060:34, 32
1A61:1F	SubIndex 031	31. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1A61:20	SubIndex 032	32. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x35 (DMC__Actual velocity))	UINT32	RO	0x6060:35, 16
1A61:21	SubIndex 033	33. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x36 (DMC__Actual position))	UINT32	RO	0x6060:36, 32
1A61:22	SubIndex 034	34. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1A61:23	SubIndex 035	35. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x37 (DMC__Error id))	UINT32	RO	0x6060:37, 32
1A61:24	SubIndex 036	36. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x38 (DMC__Input cycle counter))	UINT32	RO	0x6060:38, 8
1A61:25	SubIndex 037	37. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x39 (DMC__Channel id))	UINT32	RO	0x6060:39, 8
1A61:26	SubIndex 038	38. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x3A (DMC__Latch value))	UINT32	RO	0x6060:3A, 32
1A61:27	SubIndex 039	39. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1A61:28	SubIndex 040	40. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x3B (DMC__Cyclic info data 1))	UINT32	RO	0x6060:3B, 16
1A61:29	SubIndex 041	41. PDO Mapping entry (object 0x6060 (DMC Inputs Ch.1), entry 0x3C (DMC__Cyclic info data 2))	UINT32	RO	0x6060:3C, 16
1A61:2A	SubIndex 042	42. PDO Mapping entry (64 bits align)	UINT32	RO	0x0000:00, 64

Index 1A80 FB TxPDO-Map Position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A80:0	FB TxPDO-Map Position Ch.2	PDO Mapping TxPDO 129	UINT8	RO	0x01 (1_{dec}))
1A80:01	SubIndex 001	1. PDO Mapping entry (object 0x6100 (FB Inputs Ch.2), entry 0x11 (Position))	UINT32	RO	0x6100:11, 32

Index 1A81 DRV TxPDO-Map Statusword Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A81:0	DRV TxPDO-Map Statusword Ch.2	PDO Mapping TxPDO 130	UINT8	RO	0x01 (1_{dec}))
1A81:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x01 (Statusword))	UINT32	RO	0x6110:01, 16

Index 1A82 DRV TxPDO-Map Velocity actual value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A82:0	DRV TxPDO-Map Velocity actual value Ch.2	PDO Mapping TxPDO 131	UINT8	RO	0x01 (1_{dec}))
1A82:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x07 (Velocity actual value))	UINT32	RO	0x6110:07, 32

Index 1A83 DRV TxPDO-Map Torque actual value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A83:0	DRV TxPDO-Map Torque actual value Ch.2	PDO Mapping TxPDO 132	UINT8	RO	0x01 (1_{dec}))
1A83:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x08 (Torque actual value))	UINT32	RO	0x6110:08, 16

Index 1A84 DRV TxPDO-Map Info data 1 Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A84:0	DRV TxPDO-Map Info data 1 Ch.2	PDO Mapping TxPDO 133	UINT8	RW	0x01 (1_{dec}))
1A84:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x12 (Info data 1))	UINT32	RW	0x6110:12, 16
1A84:02	SubIndex 002	2. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:03	SubIndex 003	3. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:04	SubIndex 004	4. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:05	SubIndex 005	5. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:06	SubIndex 006	6. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:07	SubIndex 007	7. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:08	SubIndex 008	8. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:09	SubIndex 009	9. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:0A	SubIndex 010	10. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:0B	SubIndex 011	11. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:0C	SubIndex 012	12. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:0D	SubIndex 013	13. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:0E	SubIndex 014	14. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:0F	SubIndex 015	15. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A84:10	SubIndex 016	16. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0

Index 1A85 DRV TxPDO-Map Info data 2 Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A85:0	DRV TxPDO-Map Info data 2 Ch.2	PDO Mapping TxPDO 134	UINT8	RW	0x01 (1_{dec}))
1A85:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x13 (Info data 2))	UINT32	RW	0x6110:13, 16
1A85:02	SubIndex 002	2. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:03	SubIndex 003	3. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:04	SubIndex 004	4. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:05	SubIndex 005	5. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:06	SubIndex 006	6. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:07	SubIndex 007	7. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:08	SubIndex 008	8. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:09	SubIndex 009	9. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:0A	SubIndex 010	10. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:0B	SubIndex 011	11. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:0C	SubIndex 012	12. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:0D	SubIndex 013	13. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:0E	SubIndex 014	14. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:0F	SubIndex 015	15. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A85:10	SubIndex 016	16. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0

Index 1A86 DRV TxPDO-Map Following error actual value Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A86:0	DRV TxPDO-Map Following error actual value Ch.2	PDO Mapping TxPDO 135	UINT8	RO	0x01 (1_{dec}))
1A86:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x06 (Following error actual value))	UINT32	RO	0x6110:06, 32

Index 1A87 FB TxPDO-Map Touch probe status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A87:0	FB TxPDO-Map Touch probe status Ch.2	PDO Mapping TxPDO 136	UINT8	RO	0x0A (10_{dec}))
1A87:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x01 (TP1 Enable))	UINT32	RO	0x6101:01, 1
1A87:02	SubIndex 002	2. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x02 (TP1 Pos value stored))	UINT32	RO	0x6101:02, 1
1A87:03	SubIndex 003	3. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x03 (TP1 Neg value stored))	UINT32	RO	0x6101:03, 1
1A87:04	SubIndex 004	4. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A87:05	SubIndex 005	5. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x08 (TP1 Input))	UINT32	RO	0x6101:08, 1
1A87:06	SubIndex 006	6. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x09 (TP2 Enable))	UINT32	RO	0x6101:09, 1
1A87:07	SubIndex 007	7. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x0A (TP2 Pos value stored))	UINT32	RO	0x6101:0A, 1
1A87:08	SubIndex 008	8. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x0B (TP2 Neg value stored))	UINT32	RO	0x6101:0B, 1
1A87:09	SubIndex 009	9. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A87:0A	SubIndex 010	10. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x10 (TP2 Input))	UINT32	RO	0x6101:10, 1

Index 1A88 FB TxPDO-Map Touch probe 1 pos position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A88:0	FB TxPDO-Map Touch probe 1 pos position Ch.2	PDO Mapping TxPDO 137	UINT8	RO	0x01 (1_{dec}))
1A88:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x11 (TP1 Pos position))	UINT32	RO	0x6101:11, 32

Index 1A89 FB TxPDO-Map Touch probe 1 neg position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A89:0	FB TxPDO-Map Touch probe 1 neg position Ch.2	PDO Mapping TxPDO 138	UINT8	RO	0x01 (1_{dec}))
1A89:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x12 (TP1 Neg position))	UINT32	RO	0x6101:12, 32

Index 1A8A FB TxPDO-Map Touch probe 2 pos position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A8A:0	FB TxPDO-Map Touch probe 2 pos position Ch.2	PDO Mapping TxPDO 139	UINT8	RO	0x01 (1_{dec}))
1A8A:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x13 (TP2 Pos position))	UINT32	RO	0x6101:13, 32

Index 1A8B FB TxPDO-Map Touch probe 2 neg position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A8B:0	FB TxPDO-Map Touch probe 2 neg position Ch.2	PDO Mapping TxPDO 140	UINT8	RO	0x01 (1_{dec}))
1A8B:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x14 (TP2 Neg position))	UINT32	RO	0x6101:14, 32

Index 1A8D DRV TxPDO-Map Info data 3 Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A8D:0	DRV TxPDO-Map Info data 3 Ch.2	PDO Mapping TxPDO 142	UINT8	RW	0x01 (1_{dec}))
1A8D:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x14 (Info data 3))	UINT32	RW	0x6110:14, 16
1A8D:02	SubIndex 002	2. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:03	SubIndex 003	3. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:04	SubIndex 004	4. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:05	SubIndex 005	5. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:06	SubIndex 006	6. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:07	SubIndex 007	7. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:08	SubIndex 008	8. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:09	SubIndex 009	9. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:0A	SubIndex 010	10. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:0B	SubIndex 011	11. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:0C	SubIndex 012	12. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:0D	SubIndex 013	13. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:0E	SubIndex 014	14. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:0F	SubIndex 015	15. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0
1A8D:10	SubIndex 016	16. PDO Mapping entry (0 bits align)	UINT32	RW	0x0000:00, 0

Index 1A8E DRV TxPDO-Map Modes of operation display Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A8E:0	DRV TxPDO-Map Modes of operation display Ch.2	PDO Mapping TxPDO 143	UINT8	RO	0x01 (1_{dec}))
1A8E:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x03 (Modes of operation display))	UINT32	RO	0x6110:03, 8

Index 1A8F DRV TxPDO-Map Torque limitation status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A8F:0	DRV TxPDO-Map Torque limitation status Ch.2	PDO Mapping TxPDO 144	UINT8	RO	0x01 (1_{dec}))
1A8F:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (DRV Inputs Ch.2), entry 0x15 (Torque limitation status))	UINT32	RO	0x6110:15, 8

Index 1A90 DI TxPDO-Map Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A90:0	DI TxPDO-Map Inputs Ch.2	PDO Mapping TxPDO 145	UINT8	RO	0x07 (7_{dec}))
1A90:01	SubIndex 001	1. PDO Mapping entry (object 0x6120 (DI Inputs Ch.2), entry 0x01 (Input 1))	UINT32	RO	0x6120:01, 1
1A90:02	SubIndex 002	2. PDO Mapping entry (object 0x6120 (DI Inputs Ch.2), entry 0x02 (Input 2))	UINT32	RO	0x6120:02, 1
1A90:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A90:04	SubIndex 004	4. PDO Mapping entry (object 0x6120 (DI Inputs Ch.2), entry 0x05 (Encoder A))	UINT32	RO	0x6120:05, 1
1A90:05	SubIndex 005	5. PDO Mapping entry (object 0x6120 (DI Inputs Ch.2), entry 0x06 (Encoder B))	UINT32	RO	0x6120:06, 1
1A90:06	SubIndex 006	6. PDO Mapping entry (object 0x6120 (DI Inputs Ch.2), entry 0x07 (Encoder C))	UINT32	RO	0x6120:07, 1
1A90:07	SubIndex 007	7. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9

Index 1A91 FB TxPDO-Map Touch probe 1 pos timestamp Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A91:0	FB TxPDO-Map Touch probe 1 pos timestamp Ch.2	PDO Mapping TxPDO 146	UINT8	RO	0x01 (1_{dec}))
1A91:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x15 (TP1 Pos timestamp))	UINT32	RO	0x6101:15, 32

Index 1A92 FB TxPDO-Map Touch probe 1 neg timestamp Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A92:0	FB TxPDO-Map Touch probe 1 neg timestamp Ch.2	PDO Mapping TxPDO 147	UINT8	RO	0x01 (1_{dec}))
1A92:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x16 (TP1 Neg timestamp))	UINT32	RO	0x6101:16, 32

Index 1A93 FB TxPDO-Map Touch probe 2 pos timestamp Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A93:0	FB TxPDO-Map Touch probe 2 pos timestamp Ch.2	PDO Mapping TxPDO 148	UINT8	RO	0x01 (1_{dec}))
1A93:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x17 (TP2 Pos timestamp))	UINT32	RO	0x6101:17, 32

Index 1A94 FB TxPDO-Map Touch probe 2 neg timestamp Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A94:0	FB TxPDO-Map Touch probe 2 neg timestamp Ch.2	PDO Mapping TxPDO 149	UINT8	RO	0x01 (1_{dec}))
1A94:01	SubIndex 001	1. PDO Mapping entry (object 0x6101 (FB Touch probe inputs Ch.2), entry 0x18 (TP2 Neg timestamp))	UINT32	RO	0x6101:18, 32

Index 1A95 FB TxPDO-Map Secondary Position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A95:0	FB TxPDO-Map Secondary Position Ch.2	PDO Mapping TxPDO 150	UINT8	RO	0x01 (1_{dec}))
1A95:01	SubIndex 001	1. PDO Mapping entry (object 0x6100 (FB Inputs Ch.2), entry 0x15 (Secondary position))	UINT32	RO	0x6100:15, 32

Index 1AE0 DMC TxPDO-Map Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1AE0:0	DMC TxPDO-Map Inputs Ch.2	PDO Mapping TxPDO 225	UINT8	RO	0x26 (38_{dec}))
1AE0:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1AE0:02	SubIndex 002	2. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x02 (DMC__FeedbackStatus__Latch extern valid))	UINT32	RO	0x6160:02, 1
1AE0:03	SubIndex 003	3. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x03 (DMC__FeedbackStatus__Set counter done))	UINT32	RO	0x6160:03, 1
1AE0:04	SubIndex 004	4. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1AE0:05	SubIndex 005	5. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x0D (DMC__FeedbackStatus__Status of extern latch))	UINT32	RO	0x6160:0D, 1
1AE0:06	SubIndex 006	6. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1AE0:07	SubIndex 007	7. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x11 (DMC__DriveStatus__Ready to enable))	UINT32	RO	0x6160:11, 1
1AE0:08	SubIndex 008	8. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x12 (DMC__DriveStatus__Ready))	UINT32	RO	0x6160:12, 1
1AE0:09	SubIndex 009	9. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x13 (DMC__DriveStatus__Warning))	UINT32	RO	0x6160:13, 1
1AE0:0A	SubIndex 010	10. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x14 (DMC__DriveStatus__Error))	UINT32	RO	0x6160:14, 1
1AE0:0B	SubIndex 011	11. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x15 (DMC__DriveStatus__Moving positive))	UINT32	RO	0x6160:15, 1
1AE0:0C	SubIndex 012	12. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x16 (DMC__DriveStatus__Moving negative))	UINT32	RO	0x6160:16, 1
1AE0:0D	SubIndex 013	13. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1AE0:0E	SubIndex 014	14. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x1C (DMC__DriveStatus__Digital input 1))	UINT32	RO	0x6160:1C, 1
1AE0:0F	SubIndex 015	15. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x1D (DMC__DriveStatus__Digital input 2))	UINT32	RO	0x6160:1D, 1
1AE0:10	SubIndex 016	16. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1AE0:11	SubIndex 017	17. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x21 (DMC__PositioningStatus__Busy))	UINT32	RO	0x6160:21, 1
1AE0:12	SubIndex 018	18. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x22 (DMC__PositioningStatus__In-Target))	UINT32	RO	0x6160:22, 1
1AE0:13	SubIndex 019	19. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x23 (DMC__PositioningStatus__Warning))	UINT32	RO	0x6160:23, 1
1AE0:14	SubIndex 020	20. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x24 (DMC__PositioningStatus__Error))	UINT32	RO	0x6160:24, 1
1AE0:15	SubIndex 021	21. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x25 (DMC__PositioningStatus__Calibrated))	UINT32	RO	0x6160:25, 1
1AE0:16	SubIndex 022	22. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x26 (DMC__PositioningStatus__Accelerate))	UINT32	RO	0x6160:26, 1
1AE0:17	SubIndex 023	23. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x27 (DMC__PositioningStatus__Decelerate))	UINT32	RO	0x6160:27, 1
1AE0:18	SubIndex 024	24. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x28 (DMC__PositioningStatus__Ready to execute))	UINT32	RO	0x6160:28, 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1AE0:19	SubIndex 025	25. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1AE0:1A	SubIndex 026	26. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x31 (DMC__Set position))	UINT32	RO	0x6160:31, 64
1AE0:1B	SubIndex 027	27. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x32 (DMC__Set velocity))	UINT32	RO	0x6160:32, 16
1AE0:1C	SubIndex 028	28. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x33 (DMC__Actual drive time))	UINT32	RO	0x6160:33, 32
1AE0:1D	SubIndex 029	29. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x34 (DMC__Actual position lag))	UINT32	RO	0x6160:34, 64
1AE0:1E	SubIndex 030	30. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x35 (DMC__Actual velocity))	UINT32	RO	0x6160:35, 16
1AE0:1F	SubIndex 031	31. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x36 (DMC__Actual position))	UINT32	RO	0x6160:36, 64
1AE0:20	SubIndex 032	32. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x37 (DMC__Error id))	UINT32	RO	0x6160:37, 32
1AE0:21	SubIndex 033	33. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x38 (DMC__Input cycle counter))	UINT32	RO	0x6160:38, 8
1AE0:22	SubIndex 034	34. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x39 (DMC__Channel id))	UINT32	RO	0x6160:39, 8
1AE0:23	SubIndex 035	35. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x3A (DMC__Latch value))	UINT32	RO	0x6160:3A, 64
1AE0:24	SubIndex 036	36. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x3B (DMC__Cyclic info data 1))	UINT32	RO	0x6160:3B, 16
1AE0:25	SubIndex 037	37. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x3C (DMC__Cyclic info data 2))	UINT32	RO	0x6160:3C, 16
1AE0:26	SubIndex 038	38. PDO Mapping entry (64 bits align)	UINT32	RO	0x0000:00, 64

Index 1AE1 DMC TxPDO-Map Inputs 32 Bit Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1AE1:0	DMC TxPDO-Map Inputs 32 Bit Ch.2	PDO Mapping TxPDO 226	UINT8	RO	0x2A (42_{dec}))
1AE1:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1AE1:02	SubIndex 002	2. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x02 (DMC__FeedbackStatus__Latch extern valid))	UINT32	RO	0x6160:02, 1
1AE1:03	SubIndex 003	3. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x03 (DMC__FeedbackStatus__Set counter done))	UINT32	RO	0x6160:03, 1
1AE1:04	SubIndex 004	4. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1AE1:05	SubIndex 005	5. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x0D (DMC__FeedbackStatus__Status of extern latch))	UINT32	RO	0x6160:0D, 1
1AE1:06	SubIndex 006	6. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1AE1:07	SubIndex 007	7. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x11 (DMC__DriveStatus__Ready to enable))	UINT32	RO	0x6160:11, 1
1AE1:08	SubIndex 008	8. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x12 (DMC__DriveStatus__Ready))	UINT32	RO	0x6160:12, 1
1AE1:09	SubIndex 009	9. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x13 (DMC__DriveStatus__Warning))	UINT32	RO	0x6160:13, 1
1AE1:0A	SubIndex 010	10. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x14 (DMC__DriveStatus__Error))	UINT32	RO	0x6160:14, 1
1AE1:0B	SubIndex 011	11. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x15 (DMC__DriveStatus__Moving positive))	UINT32	RO	0x6160:15, 1
1AE1:0C	SubIndex 012	12. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x16 (DMC__DriveStatus__Moving negative))	UINT32	RO	0x6160:16, 1
1AE1:0D	SubIndex 013	13. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1AE1:0E	SubIndex 014	14. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x1C (DMC__DriveStatus__Digital input 1))	UINT32	RO	0x6160:1C, 1
1AE1:0F	SubIndex 015	15. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x1D (DMC__DriveStatus__Digital input 2))	UINT32	RO	0x6160:1D, 1
1AE1:10	SubIndex 016	16. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1AE1:11	SubIndex 017	17. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x21 (DMC__PositioningStatus__Busy))	UINT32	RO	0x6160:21, 1
1AE1:12	SubIndex 018	18. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x22 (DMC__PositioningStatus__In-Target))	UINT32	RO	0x6160:22, 1
1AE1:13	SubIndex 019	19. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x23 (DMC__PositioningStatus__Warning))	UINT32	RO	0x6160:23, 1
1AE1:14	SubIndex 020	20. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x24 (DMC__PositioningStatus__Error))	UINT32	RO	0x6160:24, 1
1AE1:15	SubIndex 021	21. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x25 (DMC__PositioningStatus__Calibrated))	UINT32	RO	0x6160:25, 1
1AE1:16	SubIndex 022	22. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x26 (DMC__PositioningStatus__Accelerate))	UINT32	RO	0x6160:26, 1
1AE1:17	SubIndex 023	23. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x27 (DMC__PositioningStatus__Decelerate))	UINT32	RO	0x6160:27, 1
1AE1:18	SubIndex 024	24. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x28 (DMC__PositioningStatus__Ready to execute))	UINT32	RO	0x6160:28, 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1AE1:19	SubIndex 025	25. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1AE1:1A	SubIndex 026	26. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x31 (DMC__Set position))	UINT32	RO	0x6160:31, 32
1AE1:1B	SubIndex 027	27. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1AE1:1C	SubIndex 028	28. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x32 (DMC__Set velocity))	UINT32	RO	0x6160:32, 16
1AE1:1D	SubIndex 029	29. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x33 (DMC__Actual drive time))	UINT32	RO	0x6160:33, 32
1AE1:1E	SubIndex 030	30. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x34 (DMC__Actual position lag))	UINT32	RO	0x6160:34, 32
1AE1:1F	SubIndex 031	31. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1AE1:20	SubIndex 032	32. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x35 (DMC__Actual velocity))	UINT32	RO	0x6160:35, 16
1AE1:21	SubIndex 033	33. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x36 (DMC__Actual position))	UINT32	RO	0x6160:36, 32
1AE1:22	SubIndex 034	34. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1AE1:23	SubIndex 035	35. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x37 (DMC__Error id))	UINT32	RO	0x6160:37, 32
1AE1:24	SubIndex 036	36. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x38 (DMC__Input cycle counter))	UINT32	RO	0x6160:38, 8
1AE1:25	SubIndex 037	37. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x39 (DMC__Channel id))	UINT32	RO	0x6160:39, 8
1AE1:26	SubIndex 038	38. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x3A (DMC__Latch value))	UINT32	RO	0x6160:3A, 32
1AE1:27	SubIndex 039	39. PDO Mapping entry (32 bits align)	UINT32	RO	0x0000:00, 32
1AE1:28	SubIndex 040	40. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x3B (DMC__Cyclic info data 1))	UINT32	RO	0x6160:3B, 16
1AE1:29	SubIndex 041	41. PDO Mapping entry (object 0x6160 (DMC Inputs Ch.2), entry 0x3C (DMC__Cyclic info data 2))	UINT32	RO	0x6160:3C, 16
1AE1:2A	SubIndex 042	42. PDO Mapping entry (64 bits align)	UINT32	RO	0x0000:00, 64

Index 1C00 Sync manager type

Index (hex)	Name	Meaning	Data type	Flags	Default
1C00:0	Sync manager type	Using the Sync Managers	UINT8	RO	0x04 (4_{dec}))
1C00:01	SubIndex 001	Sync-Manager Type Channel 1: Mailbox Write	UINT8	RO	0x01 (1_{dec}))
1C00:02	SubIndex 002	Sync-Manager Type Channel 2: Mailbox Read	UINT8	RO	0x02 (2_{dec}))
1C00:03	SubIndex 003	Sync-Manager Type Channel 3: Process Data Write (Outputs)	UINT8	RO	0x03 (3_{dec}))
1C00:04	SubIndex 004	Sync-Manager Type Channel 4: Process Data Read (Inputs)	UINT8	RO	0x04 (4_{dec}))

Index 1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x04 (4_{dec}))
1C12:01	SubIndex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1600 (5632_{dec}))
1C12:02	SubIndex 002	2. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1606 (5638_{dec}))
1C12:03	SubIndex 003	3. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1680 (5760_{dec}))
1C12:04	SubIndex 004	4. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1686 (5766_{dec}))
1C12:05	SubIndex 005	5. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:06	SubIndex 006	6. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:07	SubIndex 007	7. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:08	SubIndex 008	8. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:09	SubIndex 009	9. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:0A	SubIndex 010	10. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:0B	SubIndex 011	11. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:0C	SubIndex 012	12. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:0D	SubIndex 013	13. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:0E	SubIndex 014	14. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:0F	SubIndex 015	15. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:10	SubIndex 016	16. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:11	SubIndex 017	17. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:12	SubIndex 018	18. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:13	SubIndex 019	19. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:14	SubIndex 020	20. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:15	SubIndex 021	21. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:16	SubIndex 022	22. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:17	SubIndex 023	23. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:18	SubIndex 024	24. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:19	SubIndex 025	25. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:1A	SubIndex 026	26. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:1B	SubIndex 027	27. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:1C	SubIndex 028	28. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:1D	SubIndex 029	29. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C12:1E	SubIndex 030	30. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))

Index 1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x06 (6_{dec}))
1C13:01	SubIndex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{dec}))
1C13:02	SubIndex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A01 (6657_{dec}))
1C13:03	SubIndex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A06 (6662_{dec}))
1C13:04	SubIndex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A80 (6784_{dec}))
1C13:05	SubIndex 005	5. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A81 (6785_{dec}))
1C13:06	SubIndex 006	6. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A86 (6790_{dec}))
1C13:07	SubIndex 007	7. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:08	SubIndex 008	8. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:09	SubIndex 009	9. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:0A	SubIndex 010	10. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:0B	SubIndex 011	11. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:0C	SubIndex 012	12. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:0D	SubIndex 013	13. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:0E	SubIndex 014	14. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:0F	SubIndex 015	15. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:10	SubIndex 016	16. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:11	SubIndex 017	17. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:12	SubIndex 018	18. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:13	SubIndex 019	19. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:14	SubIndex 020	20. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:15	SubIndex 021	21. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:16	SubIndex 022	22. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:17	SubIndex 023	23. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:18	SubIndex 024	24. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:19	SubIndex 025	25. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:1A	SubIndex 026	26. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:1B	SubIndex 027	27. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:1C	SubIndex 028	28. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:1D	SubIndex 029	29. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:1E	SubIndex 030	30. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:1F	SubIndex 031	31. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:20	SubIndex 032	32. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:21	SubIndex 033	33. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:22	SubIndex 034	34. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:23	SubIndex 035	35. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:24	SubIndex 036	36. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:25	SubIndex 037	37. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:26	SubIndex 038	38. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:27	SubIndex 039	39. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:28	SubIndex 040	40. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:29	SubIndex 041	41. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:2A	SubIndex 042	42. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:2B	SubIndex 043	43. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))
1C13:2C	SubIndex 044	44. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec}))

Index 1C32 SM output parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32_{dec}))
1C32:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 2 Event • 2: DC-Mode - Synchron with SYNC0 Event • 3: DC-Mode - Synchron with SYNC1 Event	UINT16	RW	0x0003 (3_{dec}))
1C32:02	Cycle time	Cycle time (in ns): • Free Run: cycle time of the local timer • Synchron with SM 2 Event: cycle time of the master • DC-Mode: SYNC0/SYNC1 Cycle Time •	UINT32	RW	0x000F4240 (1000000_{dec}))
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC Mode only)	UINT32	RO	0x00000000 (0_{dec}))
1C32:04	Sync modes supported	Supported synchronization modes: • Bit 0 = 1: Free Run is supported • Bit 1 = 1: Synchron with SM 2 Event is supported • Bit 2-3 = 01: DC-Mode is supported • Bit 4-5 = 10: Output Shift with SYNC1 Event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08) •)	UINT16	RO	0x0812 (2066_{dec}))
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x0001E848 (125000_{dec}))
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC Mode only)	UINT32	RO	0x00007530 (30000_{dec}))
1C32:07	Minimum delay time		UINT32	RO	0x00007A12 (31250_{dec}))
1C32:08	Get Cycle Time	• 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started • • •	UINT16	RW	0x0000 (0_{dec}))
1C32:09	Maximum delay time	Time between SYNC1 event and output of the outputs (in ns, DC Mode only)	UINT32	RO	0x00007A12 (31250_{dec}))
1C32:0A	Sync0 Cycle Time		UINT32	RO	0x0000F424 (62500_{dec}))
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC Mode only)	UINT16	RO	0x0000 (0_{dec}))
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0_{dec}))
1C32:0D	Shift too short counter	Number of intervals between SYNC0 and SYNC1 events that are too short (DC Mode only)	UINT16	RO	0x0000 (0_{dec}))
1C32:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC Mode only)	BOOLEAN	RO	0x00 (0_{dec}))

Index 1C33 SM input parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32_{dec}))
1C33:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 3 Event (no outputs available) • 2: DC - Synchron with SYNC0 Event • 3: DC - Synchron with SYNC1 Event • 34: Synchron with SM 2 Event (outputs available)	UINT16	RW	0x0003 (3_{dec}))
1C33:02	Cycle time	as 1C32:02	UINT32	RW	0x000F4240 (1000000_{dec}))
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, DC Mode only)	UINT32	RO	0x00000000 (0_{dec}))
1C33:04	Sync modes supported	Supported synchronization modes: • Bit 0: Free Run is supported • Bit 1: Synchron with SM 2 Event is supported (outputs available) • Bit 1: Synchron with SM 3 Event is supported (no outputs available) • Bit 2-3 = 01: DC-Mode is supported • Bit 4-5 = 01: Input shift through local event (outputs available) • Bit 4-5 = 10: Input shift with SYNC1 event (no outputs available) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 or 1C33:08) •)	UINT16	RO	0x0012 (18_{dec}))
1C33:05	Minimum cycle time	as 1C32:05	UINT32	RO	0x0001E848 (125000_{dec}))
1C33:06	Calc and copy time	Time between reading of the inputs and the inputs being available for the master (in ns, DC Mode only)	UINT32	RO	0x00007530 (30000_{dec}))
1C33:07	Minimum delay time		UINT32	RO	0x00007A12 (31250_{dec}))
1C33:08	Get Cycle Time	as 1C32:08	UINT16	RW	0x0000 (0_{dec}))
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, DC Mode only)	UINT32	RO	0x00007A12 (31250_{dec}))
1C33:0A	Sync0 Cycle Time		UINT32	RO	0x0000F424 (62500_{dec}))
1C33:0B	SM event missed counter	as 1C32:11	UINT16	RO	0x0000 (0_{dec}))
1C33:0C	Cycle exceeded counter	as 1C32:12	UINT16	RO	0x0000 (0_{dec}))
1C33:0D	Shift too short counter	as 1C32:13	UINT16	RO	0x0000 (0_{dec}))
1C33:20	Sync error	as 1C32:32	BOOLEAN	RO	0x00 (0_{dec}))

8.1.4 Profile-specific objects

Index 6000 FB Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6000:0	FB Inputs Ch.1		UINT8	RO	0x15 (21_{dec}))
6000:0E	TxPDO State		BOOLEAN	RO	0x00 (0_{dec}))
6000:0F	Input cycle counter		BIT2	RO	0x00 (0_{dec}))
6000:11	Position		UINT32	RO	0x00000000 (0_{dec}))
6000:15	Secondary position		UINT32	RO	0x00000000 (0_{dec}))

Index 6001 FB Touch probe inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6001:0	FB Touch probe inputs Ch.1		UINT8	RO	0x18 (24_{dec}))
6001:01	TP1 Enable		BOOLEAN	RO	0x00 (0_{dec}))
6001:02	TP1 Pos value stored		BOOLEAN	RO	0x00 (0_{dec}))
6001:03	TP1 Neg value stored		BOOLEAN	RO	0x00 (0_{dec}))
6001:08	TP1 Input		BOOLEAN	RO	0x00 (0_{dec}))
6001:09	TP2 Enable		BOOLEAN	RO	0x00 (0_{dec}))
6001:0A	TP2 Pos value stored		BOOLEAN	RO	0x00 (0_{dec}))
6001:0B	TP2 Neg value stored		BOOLEAN	RO	0x00 (0_{dec}))
6001:10	TP2 Input		BOOLEAN	RO	0x00 (0_{dec}))
6001:11	TP1 Pos position		UINT32	RO	0x00000000 (0_{dec}))
6001:12	TP1 Neg position		UINT32	RO	0x00000000 (0_{dec}))
6001:13	TP2 Pos position		UINT32	RO	0x00000000 (0_{dec}))
6001:14	TP2 Neg position		UINT32	RO	0x00000000 (0_{dec}))
6001:15	TP1 Pos timestamp		UINT32	RO	0x00000000 (0_{dec}))
6001:16	TP1 Neg timestamp		UINT32	RO	0x00000000 (0_{dec}))
6001:17	TP2 Pos timestamp		UINT32	RO	0x00000000 (0_{dec}))
6001:18	TP2 Neg timestamp		UINT32	RO	0x00000000 (0_{dec}))

Index 6010 DRV Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6010:0	DRV Inputs Ch.1		UINT8	RO	0x15 (21_{dec}))
6010:01	Statusword	Bit 0 : Ready to switch onBit 1 : Switched onBit 2 : Operation enabledBit 3 : FaultBit 4 : reservedBit 5 : reservedBit 6 : Switch on disabledBit 7 : WarningBit 8 + 9 : reservedBit 10 : TxPDOToggleBit 11 : Internal limit activeBit 12 : Drive follows the command valueBit 13 : Input cycle counterBit 14 - 15 : reserved	UINT16	RO	0x0000 (0_{dec}))
6010:03	Modes of operation display	permitted values: • 8: Cyclic synchronous position mode (CSP) • 9: Cyclic synchronous velocity mode (CSV) • 10: Cyclic synchronous torque mode (CST) • 11: Cyclic synchronous torque mode with commutation angle (CSTCA) • 131: Drive Motion Control (DMC)	UINT8	RO	0x00 (0_{dec}))
6010:06	Following error actual value		INT32	RO	0x00000000 (0_{dec}))
6010:07	Velocity actual value		INT32	RO	0x00000000 (0_{dec}))
6010:08	Torque actual value		INT16	RO	0x0000 (0_{dec}))
6010:12	Info data 1		UINT16	RO	0x0000 (0_{dec}))
6010:13	Info data 2		UINT16	RO	0x0000 (0_{dec}))
6010:14	Info data 3		UINT16	RO	0x0000 (0_{dec}))
6010:15	Torque limitation status	Bit 0 : Torque demand value is equal to ramp inputBit 1 : High velocity limit activeBit 2 : Low velocity limit activeBit 3 - 7 : reserved	UINT8	RO	0x00 (0_{dec}))

Index 6020 DI Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6020:0	DI Inputs Ch.1		UINT8	RO	0x07 (7_{dec}))
6020:01	Input 1		BOOLEAN	RO	0x00 (0_{dec}))
6020:02	Input 2		BOOLEAN	RO	0x00 (0_{dec}))
6020:05	Encoder A		BOOLEAN	RO	0x00 (0_{dec}))
6020:06	Encoder B		BOOLEAN	RO	0x00 (0_{dec}))
6020:07	Encoder C		BOOLEAN	RO	0x00 (0_{dec}))

Index 6060 DMC Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6060:0	DMC Inputs Ch.1		UINT8	RO	0x3C (60_{dec}))
6060:02	DMC__FeedbackStatus__Latch extern valid		BOOLEAN	RO	0x00 (0_{dec}))
6060:03	DMC__FeedbackStatus__Set counter done		BOOLEAN	RO	0x00 (0_{dec}))
6060:0D	DMC__FeedbackStatus__Status of extern latch		BOOLEAN	RO	0x00 (0_{dec}))
6060:11	DMC__DriveStatus__Ready to enable		BOOLEAN	RO	0x00 (0_{dec}))
6060:12	DMC__DriveStatus__Ready		BOOLEAN	RO	0x00 (0_{dec}))
6060:13	DMC__DriveStatus__Warning		BOOLEAN	RO	0x00 (0_{dec}))
6060:14	DMC__DriveStatus__Error		BOOLEAN	RO	0x00 (0_{dec}))
6060:15	DMC__DriveStatus__Moving positive		BOOLEAN	RO	0x00 (0_{dec}))
6060:16	DMC__DriveStatus__Moving negative		BOOLEAN	RO	0x00 (0_{dec}))
6060:1C	DMC__DriveStatus__Digital input 1		BOOLEAN	RO	0x00 (0_{dec}))
6060:1D	DMC__DriveStatus__Digital input 2		BOOLEAN	RO	0x00 (0_{dec}))
6060:21	DMC__PositioningStatus__Busy		BOOLEAN	RO	0x00 (0_{dec}))
6060:22	DMC__PositioningStatus__In-Target		BOOLEAN	RO	0x00 (0_{dec}))
6060:23	DMC__PositioningStatus__Warning		BOOLEAN	RO	0x00 (0_{dec}))
6060:24	DMC__PositioningStatus__Error		BOOLEAN	RO	0x00 (0_{dec}))
6060:25	DMC__PositioningStatus__Calibrated		BOOLEAN	RO	0x00 (0_{dec}))
6060:26	DMC__PositioningStatus__Accelerate		BOOLEAN	RO	0x00 (0_{dec}))
6060:27	DMC__PositioningStatus__Decelerate		BOOLEAN	RO	0x00 (0_{dec}))
6060:28	DMC__PositioningStatus__Ready to execute		BOOLEAN	RO	0x00 (0_{dec}))
6060:31	DMC__Set position		INT64	RO	
6060:32	DMC__Set velocity		INT16	RO	0x0000 (0_{dec}))
6060:33	DMC__Actual drive time		UINT32	RO	0x00000000 (0_{dec}))
6060:34	DMC__Actual position lag		INT64	RO	
6060:35	DMC__Actual velocity		INT16	RO	0x0000 (0_{dec}))
6060:36	DMC__Actual position		INT64	RO	
6060:37	DMC__Error id		UINT32	RO	0x00000000 (0_{dec}))
6060:38	DMC__Input cycle counter		UINT8	RO	0x00 (0_{dec}))
6060:39	DMC__Channel id		UINT8	RO	0x00 (0_{dec}))
6060:3A	DMC__Latch value		INT64	RO	
6060:3B	DMC__Cyclic info data 1		INT16	RO	0x0000 (0_{dec}))
6060:3C	DMC__Cyclic info data 2		INT16	RO	0x0000 (0_{dec}))

Index 6100 FB Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6100:0	FB Inputs Ch.2		UINT8	RO	0x15 (21_{dec}))
6100:0E	TxPDO State		BOOLEAN	RO	0x00 (0_{dec}))
6100:0F	Input cycle counter		BIT2	RO	0x00 (0_{dec}))
6100:11	Position		UINT32	RO	0x00000000 (0_{dec}))
6100:15	Secondary position		UINT32	RO	0x00000000 (0_{dec}))

Index 6101 FB Touch probe inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6101:0	FB Touch probe inputs Ch.2		UINT8	RO	0x18 (24_{dec}))
6101:01	TP1 Enable		BOOLEAN	RO	0x00 (0_{dec}))
6101:02	TP1 Pos value stored		BOOLEAN	RO	0x00 (0_{dec}))
6101:03	TP1 Neg value stored		BOOLEAN	RO	0x00 (0_{dec}))
6101:08	TP1 Input		BOOLEAN	RO	0x00 (0_{dec}))
6101:09	TP2 Enable		BOOLEAN	RO	0x00 (0_{dec}))
6101:0A	TP2 Pos value stored		BOOLEAN	RO	0x00 (0_{dec}))
6101:0B	TP2 Neg value stored		BOOLEAN	RO	0x00 (0_{dec}))
6101:10	TP2 Input		BOOLEAN	RO	0x00 (0_{dec}))
6101:11	TP1 Pos position		UINT32	RO	0x00000000 (0_{dec}))
6101:12	TP1 Neg position		UINT32	RO	0x00000000 (0_{dec}))
6101:13	TP2 Pos position		UINT32	RO	0x00000000 (0_{dec}))
6101:14	TP2 Neg position		UINT32	RO	0x00000000 (0_{dec}))
6101:15	TP1 Pos timestamp		UINT32	RO	0x00000000 (0_{dec}))
6101:16	TP1 Neg timestamp		UINT32	RO	0x00000000 (0_{dec}))
6101:17	TP2 Pos timestamp		UINT32	RO	0x00000000 (0_{dec}))
6101:18	TP2 Neg timestamp		UINT32	RO	0x00000000 (0_{dec}))

Index 6110 DRV Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6110:0	DRV Inputs Ch.2		UINT8	RO	0x15 (21_{dec}))
6110:01	Statusword	Bit 0 : Ready to switch onBit 1 : Switched onBit 2 : Operation enabledBit 3 : FaultBit 4 : reservedBit 5 : reservedBit 6 : Switch on disabledBit 7 : WarningBit 8 + 9 : reservedBit 10 : TxPDOToggleBit 11 : Internal limit activeBit 12 : Drive follows the command valueBit 13 : Input cycle counterBit 14 - 15 : reserved	UINT16	RO	0x0000 (0_{dec}))
6110:03	Modes of operation display	permitted values: • 8: Cyclic synchronous position mode (CSP) • 9: Cyclic synchronous velocity mode (CSV) • 10: Cyclic synchronous torque mode (CST) • 11: Cyclic synchronous torque mode with commutation angle (CSTCA) • 131: Drive Motion Control (DMC)	UINT8	RO	0x00 (0_{dec}))
6110:06	Following error actual value		INT32	RO	0x00000000 (0_{dec}))
6110:07	Velocity actual value		INT32	RO	0x00000000 (0_{dec}))
6110:08	Torque actual value		INT16	RO	0x0000 (0_{dec}))
6110:12	Info data 1		UINT16	RO	0x0000 (0_{dec}))
6110:13	Info data 2		UINT16	RO	0x0000 (0_{dec}))
6110:14	Info data 3		UINT16	RO	0x0000 (0_{dec}))
6110:15	Torque limitation status	Bit 0 : Torque demand value is equal to ramp inputBit 1 : High velocity limit activeBit 2 : Low velocity limit activeBit 3 - 7 : reserved	UINT8	RO	0x00 (0_{dec}))

Index 6120 DI Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6120:0	DI Inputs Ch.2		UINT8	RO	0x07 (7_{dec}))
6120:01	Input 1		BOOLEAN	RO	0x00 (0_{dec}))
6120:02	Input 2		BOOLEAN	RO	0x00 (0_{dec}))
6120:05	Encoder A		BOOLEAN	RO	0x00 (0_{dec}))
6120:06	Encoder B		BOOLEAN	RO	0x00 (0_{dec}))
6120:07	Encoder C		BOOLEAN	RO	0x00 (0_{dec}))

Index 6160 DMC Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6160:0	DMC Inputs Ch.2		UINT8	RO	0x3C (60_{dec}))
6160:02	DMC__FeedbackStatus__Latch extern valid		BOOLEAN	RO	0x00 (0_{dec}))
6160:03	DMC__FeedbackStatus__Set counter done		BOOLEAN	RO	0x00 (0_{dec}))
6160:0D	DMC__FeedbackStatus__Status of extern latch		BOOLEAN	RO	0x00 (0_{dec}))
6160:11	DMC__DriveStatus__Ready to enable		BOOLEAN	RO	0x00 (0_{dec}))
6160:12	DMC__DriveStatus__Ready		BOOLEAN	RO	0x00 (0_{dec}))
6160:13	DMC__DriveStatus__Warning		BOOLEAN	RO	0x00 (0_{dec}))
6160:14	DMC__DriveStatus__Error		BOOLEAN	RO	0x00 (0_{dec}))
6160:15	DMC__DriveStatus__Moving positive		BOOLEAN	RO	0x00 (0_{dec}))
6160:16	DMC__DriveStatus__Moving negative		BOOLEAN	RO	0x00 (0_{dec}))
6160:1C	DMC__DriveStatus__Digital input 1		BOOLEAN	RO	0x00 (0_{dec}))
6160:1D	DMC__DriveStatus__Digital input 2		BOOLEAN	RO	0x00 (0_{dec}))
6160:21	DMC__PositioningStatus__Busy		BOOLEAN	RO	0x00 (0_{dec}))
6160:22	DMC__PositioningStatus__In-Target		BOOLEAN	RO	0x00 (0_{dec}))
6160:23	DMC__PositioningStatus__Warning		BOOLEAN	RO	0x00 (0_{dec}))
6160:24	DMC__PositioningStatus__Error		BOOLEAN	RO	0x00 (0_{dec}))
6160:25	DMC__PositioningStatus__Calibrated		BOOLEAN	RO	0x00 (0_{dec}))
6160:26	DMC__PositioningStatus__Accelerate		BOOLEAN	RO	0x00 (0_{dec}))
6160:27	DMC__PositioningStatus__Decelerate		BOOLEAN	RO	0x00 (0_{dec}))
6160:28	DMC__PositioningStatus__Ready to execute		BOOLEAN	RO	0x00 (0_{dec}))
6160:31	DMC__Set position		INT64	RO	
6160:32	DMC__Set velocity		INT16	RO	0x0000 (0_{dec}))
6160:33	DMC__Actual drive time		UINT32	RO	0x00000000 (0_{dec}))
6160:34	DMC__Actual position lag		INT64	RO	
6160:35	DMC__Actual velocity		INT16	RO	0x0000 (0_{dec}))
6160:36	DMC__Actual position		INT64	RO	
6160:37	DMC__Error id		UINT32	RO	0x00000000 (0_{dec}))
6160:38	DMC__Input cycle counter		UINT8	RO	0x00 (0_{dec}))
6160:39	DMC__Channel id		UINT8	RO	0x00 (0_{dec}))
6160:3A	DMC__Latch value		INT64	RO	
6160:3B	DMC__Cyclic info data 1		INT16	RO	0x0000 (0_{dec}))
6160:3C	DMC__Cyclic info data 2		INT16	RO	0x0000 (0_{dec}))

Index 7001 FB Touch probe outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
7001:0	FB Touch probe outputs Ch.1		UINT8	RO	0x0E (14_{dec}))
7001:01	TP1 Enable		BOOLEAN	RO	0x00 (0_{dec}))
7001:02	TP1 Continous		BOOLEAN	RO	0x00 (0_{dec}))
7001:03	TP1 Trigger mode		BIT2	RO	0x00 (0_{dec}))
7001:05	TP1 Enable pos edge		BOOLEAN	RO	0x00 (0_{dec}))
7001:06	TP1 Enable neg edge		BOOLEAN	RO	0x00 (0_{dec}))
7001:09	TP2 Enable		BOOLEAN	RO	0x00 (0_{dec}))
7001:0A	TP2 Continous		BOOLEAN	RO	0x00 (0_{dec}))
7001:0B	TP2 Trigger mode		BIT2	RO	0x00 (0_{dec}))
7001:0D	TP2 Enable pos edge		BOOLEAN	RO	0x00 (0_{dec}))
7001:0E	TP2 Enable neg edge		BOOLEAN	RO	0x00 (0_{dec}))

Index 7010 DRV Outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
7010:0	DRV Outputs Ch.1		UINT8	RO	0x13 (19_{dec}))
7010:01	Controlword	Bit 0 : Switch onBit 1 : Enable voltageBit 2 : reservedBit 3 : Enable operationBit 4 - 6 : reservedBit 7 : Fault resetBit 8 - 15 : reserved	UINT16	RO	0x0000 (0_{dec}))
7010:03	Modes of operation	permitted values: • 8: Cyclic synchronous position mode (CSP) • 9: Cyclic synchronous velocity mode (CSV) • 10: Cyclic synchronous torque mode (CST) • 11: Cyclic synchronous torque mode with commutation angle (CSTCA) • 131: Drive Motion Control (DMC)	UINT8	RW	0x08 (8_{dec}))
7010:05	Target position		UINT32	RO	0x00000000 (0_{dec}))
7010:06	Target velocity		INT32	RO	0x00000000 (0_{dec}))
7010:09	Target torque		INT16	RO	0x0000 (0_{dec}))
7010:0A	Torque offset		INT16	RO	0x0000 (0_{dec}))
7010:0B	Torque limitation		UINT16	RW	0x7FFF (32767_{dec}))
7010:0E	Commutation angle		UINT16	RO	0x0000 (0_{dec}))
7010:0F	Velocity offset		INT32	RO	0x00000000 (0_{dec}))
7010:10	Positive torque limit value		UINT16	RW	0x7FFF (32767_{dec}))
7010:11	Negative torque limit value		UINT16	RW	0x7FFF (32767_{dec}))
7010:12	Low velocity limit value		INT32	RW	0x00000000 (0_{dec}))
7010:13	High velocity limit value		INT32	RW	0x00000000 (0_{dec}))

Index 7060 DMC Outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
7060:0	DMC Outputs Ch.1		UINT8	RO	0x36 (54_{dec}))
7060:02	DMC__FeedbackControl__Enable latch extern on positive edge		BOOLEAN	RO	0x00 (0_{dec}))
7060:03	DMC__FeedbackControl__Set counter		BOOLEAN	RO	0x00 (0_{dec}))
7060:04	DMC__FeedbackControl__Enable latch extern on negative edge		BOOLEAN	RO	0x00 (0_{dec}))
7060:11	DMC__DriveControl__Enable		BOOLEAN	RO	0x00 (0_{dec}))
7060:12	DMC__DriveControl__Reset		BOOLEAN	RO	0x00 (0_{dec}))
7060:21	DMC__PositioningControl__Execute		BOOLEAN	RO	0x00 (0_{dec}))
7060:22	DMC__PositioningControl__Emergency stop		BOOLEAN	RO	0x00 (0_{dec}))
7060:31	DMC__Set counter value		INT64	RO	
7060:32	DMC__Target position		INT64	RO	
7060:33	DMC__Target velocity		INT16	RO	0x0000 (0_{dec}))
7060:34	DMC__Start type		UINT16	RO	0x0000 (0_{dec}))
7060:35	DMC__Target acceleration		UINT16	RO	0x0000 (0_{dec}))
7060:36	DMC__Target deceleration		UINT16	RO	0x0000 (0_{dec}))

Index 7101 FB Touch probe outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
7101:0	FB Touch probe outputs Ch.2		UINT8	RO	0x0E (14_{dec}))
7101:01	TP1 Enable		BOOLEAN	RO	0x00 (0_{dec}))
7101:02	TP1 Continous		BOOLEAN	RO	0x00 (0_{dec}))
7101:03	TP1 Trigger mode		BIT2	RO	0x00 (0_{dec}))
7101:05	TP1 Enable pos edge		BOOLEAN	RO	0x00 (0_{dec}))
7101:06	TP1 Enable neg edge		BOOLEAN	RO	0x00 (0_{dec}))
7101:09	TP2 Enable		BOOLEAN	RO	0x00 (0_{dec}))
7101:0A	TP2 Continous		BOOLEAN	RO	0x00 (0_{dec}))
7101:0B	TP2 Trigger mode		BIT2	RO	0x00 (0_{dec}))
7101:0D	TP2 Enable pos edge		BOOLEAN	RO	0x00 (0_{dec}))
7101:0E	TP2 Enable neg edge		BOOLEAN	RO	0x00 (0_{dec}))

Index 7110 DRV Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
7110:0	DRV Outputs Ch.2		UINT8	RO	0x13 (19_{dec}))
7110:01	Controlword	Bit 0 : Switch onBit 1 : Enable voltageBit 2 : reservedBit 3 : Enable operationBit 4 - 6 : reservedBit 7 : Fault resetBit 8 - 15 : reserved	UINT16	RO	0x0000 (0_{dec}))
7110:03	Modes of operation	permitted values: • 8: Cyclic synchronous position mode (CSP) • 9: Cyclic synchronous velocity mode (CSV) • 10: Cyclic synchronous torque mode (CST) • 11: Cyclic synchronous torque mode with commutation angle (CSTCA) • 131: Drive Motion Control (DMC)	UINT8	RW	0x08 (8_{dec}))
7110:05	Target position		UINT32	RO	0x00000000 (0_{dec}))
7110:06	Target velocity		INT32	RO	0x00000000 (0_{dec}))
7110:09	Target torque		INT16	RO	0x0000 (0_{dec}))
7110:0A	Torque offset		INT16	RO	0x0000 (0_{dec}))
7110:0B	Torque limitation		UINT16	RW	0x7FFF (32767_{dec}))
7110:0E	Commutation angle		UINT16	RO	0x0000 (0_{dec}))
7110:0F	Velocity offset		INT32	RO	0x00000000 (0_{dec}))
7110:10	Positive torque limit value		UINT16	RW	0x7FFF (32767_{dec}))
7110:11	Negative torque limit value		UINT16	RW	0x7FFF (32767_{dec}))
7110:12	Low velocity limit value		INT32	RW	0x00000000 (0_{dec}))
7110:13	High velocity limit value		INT32	RW	0x00000000 (0_{dec}))

Index 7160 DMC Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
7160:0	DMC Outputs Ch.2		UINT8	RO	0x36 (54_{dec}))
7160:02	DMC__FeedbackControl__Enable latch extern on positive edge		BOOLEAN	RO	0x00 (0_{dec}))
7160:03	DMC__FeedbackControl__Set counter		BOOLEAN	RO	0x00 (0_{dec}))
7160:04	DMC__FeedbackControl__Enable latch extern on negative edge		BOOLEAN	RO	0x00 (0_{dec}))
7160:11	DMC__DriveControl__Enable		BOOLEAN	RO	0x00 (0_{dec}))
7160:12	DMC__DriveControl__Reset		BOOLEAN	RO	0x00 (0_{dec}))
7160:21	DMC__PositioningControl__Execute		BOOLEAN	RO	0x00 (0_{dec}))
7160:22	DMC__PositioningControl__Emergency stop		BOOLEAN	RO	0x00 (0_{dec}))
7160:31	DMC__Set counter value		INT64	RO	
7160:32	DMC__Target position		INT64	RO	
7160:33	DMC__Target velocity		INT16	RO	0x0000 (0_{dec}))
7160:34	DMC__Start type		UINT16	RO	0x0000 (0_{dec}))
7160:35	DMC__Target acceleration		UINT16	RO	0x0000 (0_{dec}))
7160:36	DMC__Target deceleration		UINT16	RO	0x0000 (0_{dec}))

Index F000 Modular Device Profile

Index (hex)	Name	Meaning	Data type	Flags	Default
F000:0	Modular Device Profile	General information for the Modular Device Profile	UINT8	RO	0x02 (2_{dec}))
F000:01	Index distance	Index distance of the objects of the individual channels	UINT16	RO	0x0010 (16_{dec}))
F000:02	Maximum number of modules	Number of channels	UINT16	RO	0x0017 (23_{dec}))

Index F008 Code word

Index (hex)	Name	Meaning	Data type	Flags	Default
F008:0	Code word		UINT32	RW	0x00000000 (0_{dec}))

Index F010 Module Profile List

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module Profile List		UINT8	RO	0x17 (23_{dec}))
F010:01	SubIndex 001		UINT32	RO	0x00000201 (513_{dec}))
F010:02	SubIndex 002		UINT32	RO	0x000002E6 (742_{dec}))
F010:03	SubIndex 003		UINT32	RO	0x00000064 (100_{dec}))
F010:04	SubIndex 004		UINT32	RO	0x00000000 (0_{dec}))
F010:05	SubIndex 005		UINT32	RO	0x00000000 (0_{dec}))
F010:06	SubIndex 006		UINT32	RO	0x00000000 (0_{dec}))
F010:07	SubIndex 007		UINT32	RO	0x000002EE (750_{dec}))
F010:08	SubIndex 008		UINT32	RO	0x00000000 (0_{dec}))
F010:09	SubIndex 009		UINT32	RO	0x00000000 (0_{dec}))
F010:0A	SubIndex 010		UINT32	RO	0x00000000 (0_{dec}))
F010:0B	SubIndex 011		UINT32	RO	0x00000000 (0_{dec}))
F010:0C	SubIndex 012		UINT32	RO	0x00000000 (0_{dec}))
F010:0D	SubIndex 013		UINT32	RO	0x00000000 (0_{dec}))
F010:0E	SubIndex 014		UINT32	RO	0x00000000 (0_{dec}))
F010:0F	SubIndex 015		UINT32	RO	0x00000000 (0_{dec}))
F010:10	SubIndex 016		UINT32	RO	0x00000000 (0_{dec}))
F010:11	SubIndex 017		UINT32	RO	0x00000201 (513_{dec}))
F010:12	SubIndex 018		UINT32	RO	0x000002E6 (742_{dec}))
F010:13	SubIndex 019		UINT32	RO	0x00000064 (100_{dec}))
F010:14	SubIndex 020		UINT32	RO	0x00000000 (0_{dec}))
F010:15	SubIndex 021		UINT32	RO	0x00000000 (0_{dec}))
F010:16	SubIndex 022		UINT32	RO	0x00000000 (0_{dec}))
F010:17	SubIndex 023		UINT32	RO	0x000002EE (750_{dec}))

Index F081 Download revision

Index (hex)	Name	Meaning	Data type	Flags	Default
F081:0	Download revision		UINT8	RO	0x01 (1_{dec}))
F081:01	Revision number		UINT32	RW	0x00000000 (0_{dec}))

Index FB00 Command

Index (hex)	Name	Meaning	Data type	Flags	Default
FB00:0	Command		UINT8	RO	0x03 (3_{dec}))
FB00:01	Request		OCTET-STRING[2]	RW	{0}
FB00:02	Status		UINT8	RO	0x00 (0_{dec}))
FB00:03	Response		OCTET-STRING[6]	RO	{0}

Index FB13 DRV Key code

Index (hex)	Name	Meaning	Data type	Flags	Default
FB13:0	DRV Key code		UINT8	RO	0x01 (1_{dec}))
FB13:01	Code		OCTET-STRING[32]	RW	{0}

Index FB40 Memory interface

Index (hex)	Name	Meaning	Data type	Flags	Default
FB40:0	Memory interface		UINT8	RO	0x03 (3_{dec}))
FB40:01	Address		UINT32	RW	0x00000000 (0_{dec}))
FB40:02	Length		UINT16	RW	0x0000 (0_{dec}))
FB40:03	Data		OCTET-STRING[8]	RW	{0}

9 Appendix

9.1 Documentation issue status

Version	Comment
1.1	• Chapter "Short guide to commissioning updated • Chapter "Commissioning" updated
1.0	• First release

9.2 Disposal



Products marked with a crossed-out wheeled bin shall not be discarded with the normal waste stream. The device is considered as waste electrical and electronic equipment. The national regulations for the disposal of waste electrical and electronic equipment must be observed.

9.3 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

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You will also find further documentation for Beckhoff components there.

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The Beckhoff Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
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- and extensive training program for Beckhoff system components

Hotline:	+49 5246 963 157
e-mail:	support@beckhoff.com
web:	www.beckhoff.com/support

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- spare parts service
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Hotline:	+49 5246 963 460
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