

Interface Description

Interroll RollerDrive EC5000 BI



CANopen®

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Content

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1 About this document

The Interface Description describes the interfaces and signals of the Interroll RollerDrives EC5000 BI.

The EC5000 BI is CANopen certified from software version „FW 2.0.1“.

The latest version of this supplement can be found online at:

www.interroll.com/products-solutions/downloads/

All the information and advice in this document has been compiled with respect to applicable standards and regulations as well as the current state of the art.

- To ensure safe and faultless operation and to fulfil any warranty claims that may apply, first read the operating manuals of the RollerDrive EC5000 and observe the instructions.



The manufacturer assumes no liability for damage and malfunctions that occur as a result of non-compliance with these operating manuals.



Should you still have any unanswered questions after reading the operating manuals, please contact Interroll customer service. Contact details for your region can be found online at www.interroll.com/contact/

1.1 Object types / Abbreviations

| | |
|-------------------------|-----------------------------|
| VAR | Variant |
| INT8 / INT16 / INT32 | Integer |
| UINT8 / UINT16 / UINT32 | Unsigned Integer |
| STRING | Unformatierter Text |
| Dec | Decimal |
| SDO | Service Data Object |
| TxPDO | Process Data Object (write) |
| RxPDO | Process Data Object (read) |
| FW | Firmware |
| ro | Read Only |
| rw | Read Write |
| const | Constant |
| otw | One Time Write |

General information

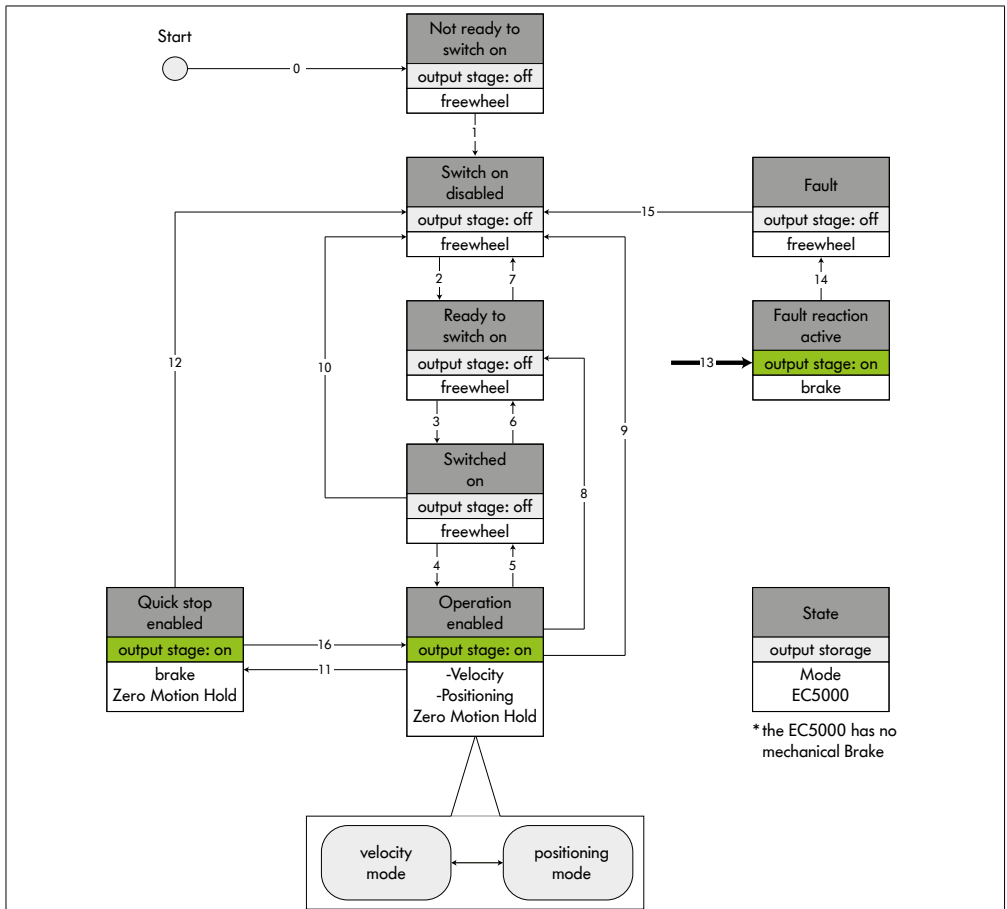
2 General information

2.1 The State machine

The EC5000 BI is controlled by an internal state machine.

The transitions to the next state are made by entering the commands in the control word of the process data.

The feedback of the active state takes place in the status word of the process data.



2.2 Transitions

| Transition | Control Command | Bit 7...0 control word | | | | |
|--|-------------------|---------------------------|---|---|---|---|
| | | 7 | 3 | 2 | 1 | 0 |
| 1 „Not ready to switch on“ to „Switch on disabled“ Automatic | - | - | | | | |
| 2 „Switch on disabled“ to „Ready to switch on“ | Shut down | 0 | X | 1 | 1 | 0 |
| 3 „Ready to switch on“ to „Switched on“ | Switch on | 0 | X | 1 | 1 | 1 |
| 4 „Switched on“ to „Operation enabled“ Power is switched on | Enable operation | 0 | 1 | 1 | 1 | 1 |
| 5 „Operation enabled“ to „Switched on“ Power is switched off | Disable operation | 0 | 0 | 1 | 1 | 1 |
| 6 „Switched on“ to „Ready to switch on“ | Shut down | 0 | X | 1 | 1 | 0 |
| 7 „Ready to switch on“ to „Switch on disabled“ | Lock power | 0 | X | X | 0 | X |
| | Quick stop | 0 | X | 0 | 1 | X |
| 8 „Operation enabled“ to „Ready to switch on“ | Shut down | 0 | X | 1 | 1 | 0 |
| 9 „Operation enabled“ to „Switch on disabled“ | Lock power | 0 | X | X | 0 | X |
| 10 „Switched on“ to „Switch on disabled“ | Lock power | 0 | X | X | 0 | X |
| | Quick stop | 0 | X | 0 | 1 | X |
| 11 „Operation enabled“ to „Quick stop enabled“ | Quick stop | 0 | X | 0 | 1 | X |
| 12 „Quick stop enabled“ to „Switch on disabled“ | Lock power | 0 | X | X | 0 | X |
| 13 Automatically after the occurrence of a fault from any state | - | - | | | | |
| 14 Automatisch nach abgeschlossener Störungsreaktion („Störung aktiv“) | - | - | | | | |
| 15 Error response | Quit error | 0 | X | X | X | X |
| | | -> | 1 | X | X | X |
| 16 „Quick stop enabled“ to „Operation enabled“ | | | | | | |

Addressing

3 Addressing

In the delivery state, every EC5000 BI has the node ID 127.

This node ID has a special status at Interroll and enables addressing using LSS (CiA_305).

The following modes are supported:

Switch state global protocol' (CiA305 / 7.4.1)

- With this procedure, every motor that is connected to the CAN bus receives the same node ID. For this reason, only one motor should be connected to the CAN bus!
- With the node ID = 127, the assigned node ID becomes temporarily active after configuration.
- Without a store command, the assigned node ID is lost after a restart and the EC5000 has the node ID 127 again.

Switch State Selective protocol (CiA305 / 7.4.2)

- Several EC5000s can be connected to the bus.
- Only the EC5000 will be brought into the LSS configuration mode, whose identity is based on the values
 - Vendor ID,
 - Product Code,
 - Revision number,
 - Serial number,is equivalent to.
- With the node ID = 127, the assigned node ID becomes temporarily active after the configuration.
- Without a store command, the assigned node ID is lost after a restart and the EC5000 has the node ID 127 again.

4 RollerDrive in operation

4.1 Switching between the three modes

A total of three different operating modes are supported:

- Profile Position Mode Mode 1
- Homing Mode Mode 6
- Profile Velocity Mode Mode 3 (Default)

The mode can be selected by object 6060h („General objects“ on page 31).

The table lists the transition numbers equivalent to the state machine:

Übergangsmatrix

| Ausgangszustand | | Folgezustand | | | | | | | | | | | | |
|-----------------|---------------------------------|--------------|-------------|--------------------|-------|-----------------------------|-------------------|-------------|---------------------------------|-----------------------------|-------------------------|-----------------------------|-----------------------------|--------|
| | | x | x | x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 51 | 52 | |
| State Nr | State Name | Modus | Switched on | Quick Stop enabled | Fault | Zero Motion Hold - position | start positioning | positioning | Finish positioning without stop | Finish positioning and stop | Zero Motion Hold - halt | abort positioning procedure | Zero Motion Hold - velocity | Run |
| x | Switched on | x | -- | no | yes | yes | no | no | no | no | no | no | yes | no |
| x | Quick Stop enabled | x | no | -- | yes | yes | no | no | no | no | no | no | yes | no |
| x | Fault | x | no | no | -- | no | no | no | no | no | no | no | no | no |
| 1 | Zero Motion Hold - position | Positioning | yes | yes | yes | -- | yes 1 | no | no | no | yes 13.4 | no | no | no |
| 2 | start positioning | Positioning | yes | yes | yes | no | -- | yes 2 | no | no | yes 13.1 | no | no | no |
| 3 | positioning | Positioning | yes | yes | yes | yes 3 | yes 4 | -- | yes 5 | yes 8 | yes 13.0 | no | no | no |
| 4 | Finish positioning without stop | Positioning | yes | yes | yes | no | yes 11 | yes 7 | yes 6 | no | yes 13.2 | no | no | no |
| 5 | Finish positioning and stop | Positioning | yes | yes | yes | no | yes 12 | yes 10 | no | yes 9 | yes 13.3 | no | no | no |
| 6 | Zero Motion Hold - halt | Positioning | yes | yes | yes | yes 14.4 | yes 14.1 | yes 14.0 | yes 14.2 | yes 14.3 | -- | yes 15 | yes 37 | no |
| 7 | abort positioning procedure | Positioning | yes | yes | yes | no | no | no | no | no | no | -- | yes 38 | no |
| 51 | Zero Motion Hold - velocity | Velocity | yes | yes | yes | yes 30 | no | no | no | no | no | -- | -- | yes 51 |
| 52 | Run | Velocity | yes | yes | yes | no | no | no | no | no | no | no | yes 52 | -- |

4.2 Profile Velocity Mode

Communication objects

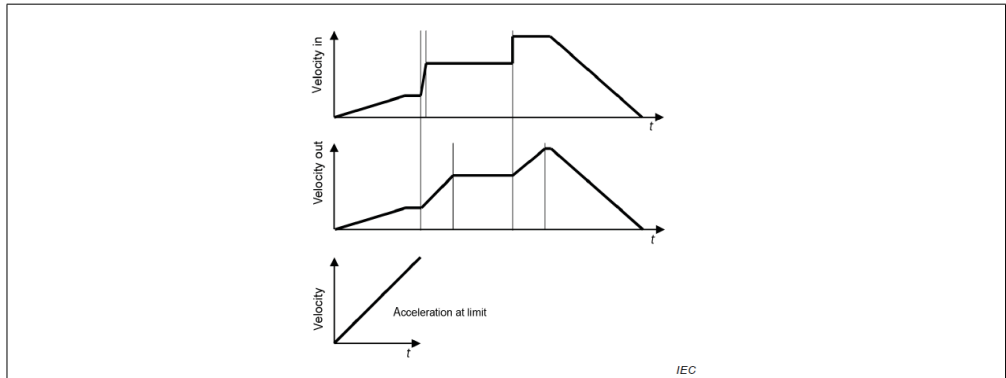
The following objects are needed to control or monitor the „velocity mode“:

| Index | Object | Object Type | Data Type |
|-------|---|-------------|-----------|
| 60FFh | Target Velocity [mm/s] | VAR | INT32 |
| 6083h | Profile Acceleration [mm/s ²] | VAR | UINT32 |
| 6084h | Profile Deceleration [mm/s ²] | VAR | UINT32 |
| 607Eh | Polarity | VAR | UINT32 |

RollerDrive in operation

Velocity Funktion

The actual velocity („Velocity actual value“ - 606Ch) follows the target velocity („Target velocity“ - 60FFh) by defined ramps. The RD is stopped by setting the stop bit (bit 8) in the controlword or by specifying a target velocity („Target velocity“ - 60FFh) below the minimum possible velocity. As soon as the RD is below the minimum possible velocity, the current position at that moment is to be held (Zero Motion Hold).



The „profile velocity mode“ can also be controlled via HaltBit 8 of the control word. The meaning of the individual bits is listed in the following table.

Bit 8 (Halt) can be used for stopping and starting.

Bit 8 (Halt) can be used to switch the Zero Motion Hold function on (motor stopped) and off (motor moving). If the RD is to be in idle mode at standstill, the output stage must be switched off by the control word (this is not possible in the analog variant).

RollerDrive in operation

Controlword-Bitregister

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-------------------------|--------------------------|
| Meaning | Manufacturer specific | Manufacturer specific | Manufacturer specific | Manufacturer specific | Manufacturer specific | Reserved | Operation Mode specific | Halt |
| Value | X | X | X | X | X | 0 | X | 0 rotating 1 standing |

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|-------------|----------|----------|----------|------------------|------------|----------------|-----------|
| Meaning | Fault reset | Not used | Not used | Not used | Enable operation | Quick stop | Enable voltage | Switch on |
| Value | 0 | X | X | X | 1 | 1 | 1 | 1 |

Controlword bit register in velocity mode -> during rotating movement

Statusword-Bitregister

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
|---------|-----------------------|-----------------------|----------|----------|-----------------------|----------|--------|--|
| Meaning | Manufacturer specific | Manufacturer specific | Reserved | Reserved | Internal limit active | Reserved | Remote | Manufacturer specific / Internal Error Bit |
| Value | | | 0 | 0 | | 0 | | 0 |

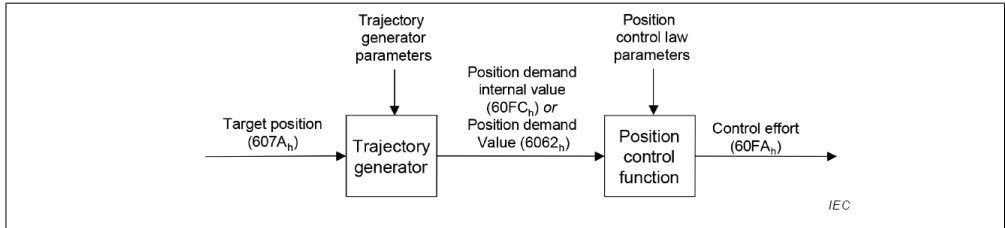
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|---------|--------------------|------------|-----------------|-------|-------------------|-------------|--------------------|
| Meaning | Warning | Switch on disabled | Quick stop | Voltage enabled | Fault | Operation enabled | Switched on | Ready to switch on |
| Value | | | | | | | | |

Statusword-Bitregister in velocity mode

RollerDrive in operation

4.3 Profile Position Mode

During positioning, the RD is given a target position („Target position“ - 607Ah). This target position is approached with a defined target velocity („Profile velocity“ - 6081h). The acceleration ramp („Profile acceleration“ - 6083h) and the deceleration ramp („Profile deceleration“ - 6084h) are also specified. When the position has been reached, the position is held (Zero Motion Hold). Exactly the specified position is held.



The target positions („Target position“ - 607Ah) can be specified as absolute value or as relative value. The relative and absolute positioning is distinguished via the control word bit 6 (abs/rel). Relative positioning is implemented when bit 6 of the control word is 1.

Communication objects

| Object | Name | Meaning | Access | Communication |
|--------|-----------------------|---|--------|---------------|
| 6062h | Position demand value | Calculated / controlled target position | ro | SDO |
| 6064h | Position actual value | Actual position | ro | TxPDO 2 |
| 607Ah | Target position | | rw | RxPDO 2 |
| 6081h | Profile velocity | | rw | SDO |
| 6083h | Profile acceleration | | rw | SDO |
| 6084h | Profile deceleration | | rw | SDO |

RollerDrive in operation

Controlword-Bitregister

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
|---------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------|-----------------------|--------------------------|
| Meaning | Manu- facturer specific | Manu- facturer specific | Manu- facturer specific | Manu- facturer specific | Manu- facturer specific | Reserved | Change of Setpoint | Halt |
| Value | X | X | X | X | X | 0 | | 0 rotating 1 standing |

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|-------------|-----------------------|--------------------------|------------------|---------------------|---------------|-------------------|-----------|
| Meaning | Fault reset | Absolute/ Relative | Change set immediatly | New Set Point | Enable operation | Quick stop | Enable voltage | Switch on |
| Value | 0 | | | | 1 | 1 | 1 | 1 |

Controlword-Bitregister in position mode

Statusword-Bitregister

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
|---------|-------------------------------|-------------------------------|--------------------|-------------------------------|--------------------------|-------------------|--------|---|
| Meaning | Manu- facturer specific | Manu- facturer specific | Following Error | Set Point acknow- ledge | Internal limit active | Target reached | Remote | Manufacturer specific / Internal Error Bit |
| Value | | | | | | | | |

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|---------|-----------------------|------------|--------------------|-------|----------------------|----------------|-----------------------|
| Meaning | Warning | Switch on disabled | Quick stop | Voltage enabled | Fault | Operation enabled | Switched on | Ready to switch on |
| Value | | | | | | | | |

Statusword-Bitregister in position mode

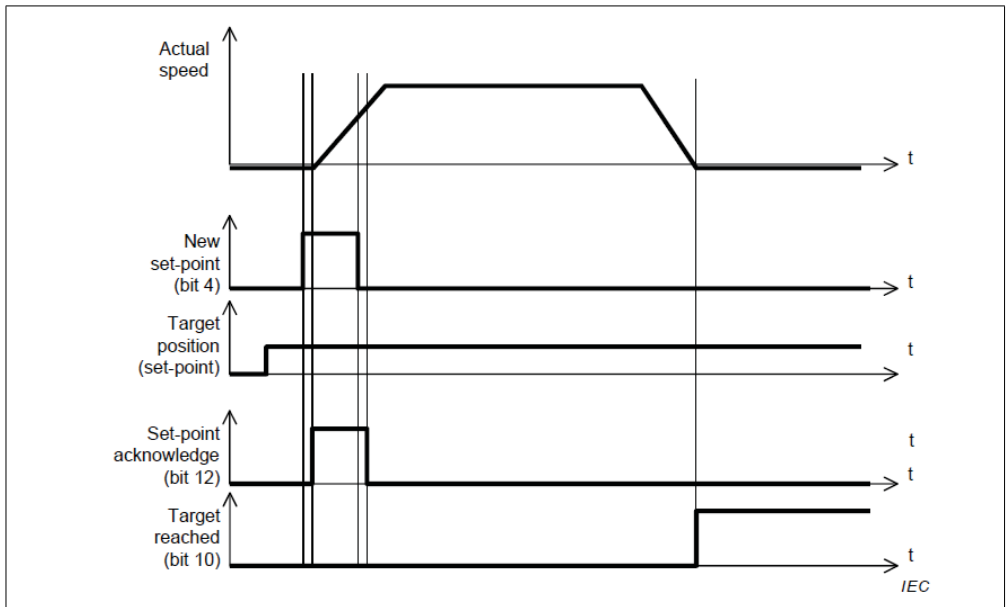
RollerDrive in operation

Positioning Function

A target position is specified by object 607Ah („Target position“). This is the position that is declared as the next target. Only by setting the „New set point“ bit (4) in the control word is it signaled to the RD that this position is to be approached. The RD confirms receipt of the positioning job by setting the „Set point acknowledge“ bit (12) in the status word.

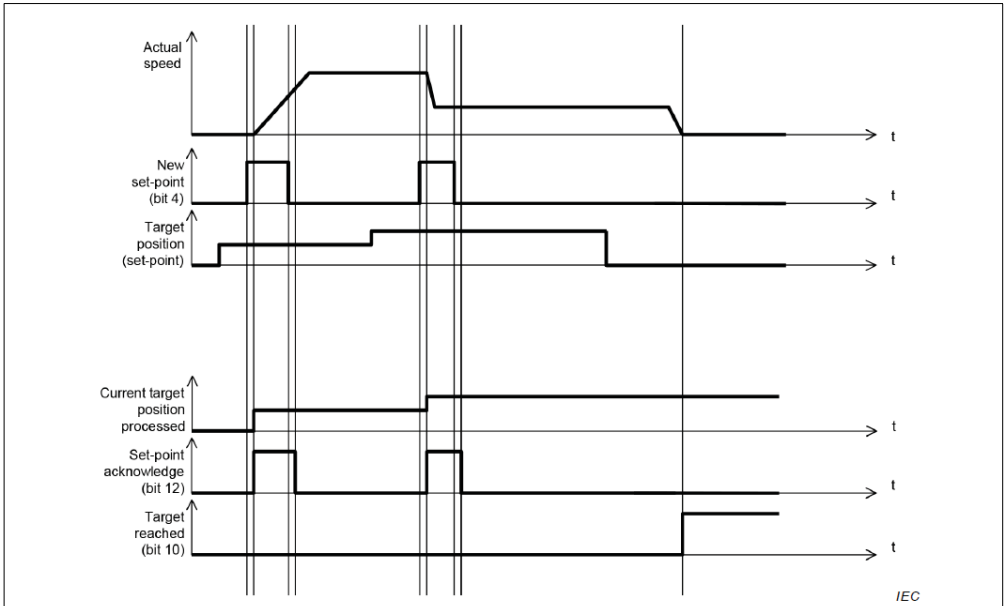
The control unit can then reset bit 4 „New set point“. The RD confirms this by resetting bit 12 „Set point acknowledge“ in the status word. As soon as bit 12 has been reset, a new target address can be transmitted. When the target has been reached, this is signaled by means of bit 10 „Target reached“.

The acceleration, velocity and braking values are defined by objects 6081h („Profile velocity“) and 6083h („Profile acceleration“). The system level of the RD calculates independently when the RD must be braked in order to approach the position exactly and without overshoot.



Single Position Mode

A positioning process can be interrupted by setting a new target address and setting bit 5 („Change set immediately“) in the control word and then setting bit 4 („New Set Point“) in the control word. The positioning is interrupted immediately and the new position is approached. (Transition 4).



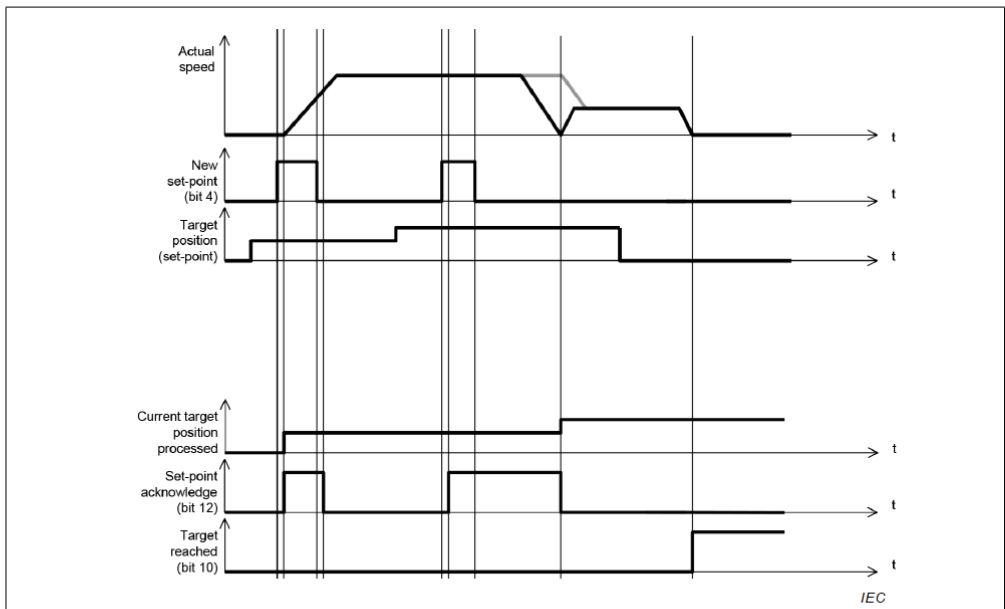
RollerDrive in operation

Set of Set-Points

Another target position („Target position“ - 607Ah) can already be assigned to the RD in the buffer, which is to be approached when the current travel job is completed. Bit 5 („Change set immediately“) is set to 0 for this purpose. Successful saving is confirmed by bit 12 (set point acknowledge) of the RD status word by means of an edge. The control unit then resets bit 4 („New set point“) in the control word. However, the RD leaves a 1 on bit 12 („Set point acknowledge“) until the current positioning is completed. Reaching the position is not signaled.

The positioning of the second position can be started in two ways depending on bit 9 „Change of set point“ of the control word.

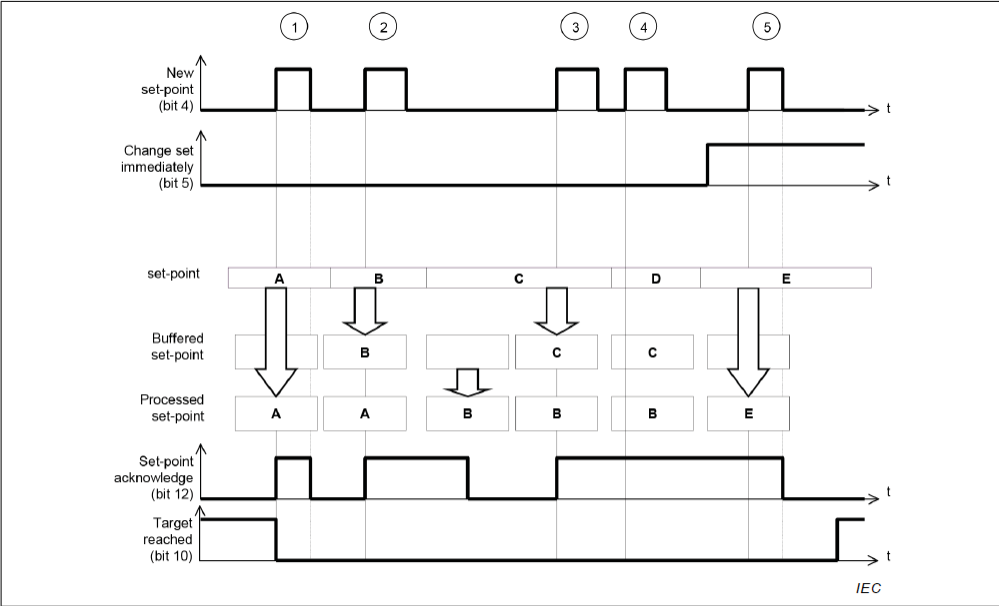
- Bit 9 = 1 -> The first position is approached at full speed (no braking) and then the second position is approached directly. The speed is adjusted if necessary. (gray course of the speed)
- Bit 9 = 0 -> The first position is approached „normally“ with final braking. As soon as the position is reached, the second position is approached directly. (Black course of the speed)



There can be a maximum of one position in the buffer. A new position can only be written into the buffer if the „Set Point acknowledge“ bit (12) of the statusword is set to 0.

However, if the „Change set immediately“ bit (5) is set, the target position („Target position“ - 607Ah) transmitted or present at that moment is adopted.

RollerDrive in operation

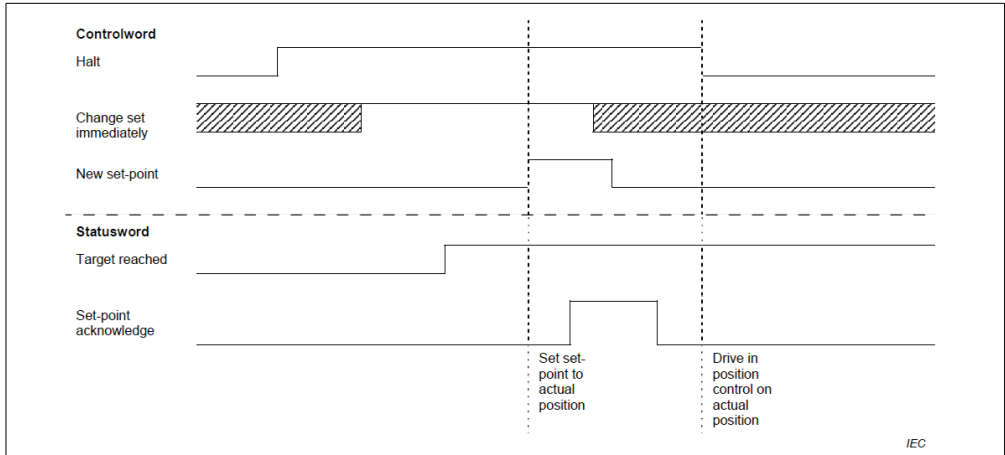


RollerDrive in operation

Halt Funktion

By means of the „Halt“ bit (bit 9) of the control word any positioning can be interrupted. The RD changes at that moment into a Zero Motion Halt state. When the „Halt“ bit is reset, the RD jumps back to the state in which the RD was before and completes the positioning process.

It is also possible to end the positioning process by using the handshake described in the following Figure. In this case, the current position is defined as the new „target position“.



Homing mode

Homing mode 37 is supported in accordance with the CanOpen standard. This mode can be used to set the current position of the motor to zero.

To execute the homing mode, the homing mode must first be selected. For this purpose, the drive must be in standstill with HaltBit or in an Operation disabled state. Bit 4 in the control word is then set to 1. Subsequently, another operating mode can be selected.

5 Error management

5.1 Predefined Error Field (1003h)

The last 8 error messages are stored in the Predefined Error Field. The newest message is always on the lowest SubIndex.

All upcoming errors are entered in accordance with the standard; there is no entry for errors that no longer exist.

The content of the error field is composed of the following content:

| Byte 3 | Byte 2 | Byte 1 | Byte 0 |
|--------|--------|------------|--------|
| intern | intern | Error Code | |

5.2 Acknowledge of an error

Warnings do not have to be acknowledged.

All errors must be acknowledged.

Can-Bus variant

As soon as no more errors are present, the „Fault“ state (see chapter Fault2.3.8) can be exited by setting a positive edge in bit 7 of the control word. This acknowledges the error and the „Fault“ state can be exited.

Object 6007h „Abort connection Code“ can be used to determine how the motor should behave in the event of faulty CAN communication.

| Value | Definition |
|--------------|------------------------|
| -32768 to -1 | Manufacturer specific |
| 0 | No action |
| +1 | Fault signal |
| +2 | Disable voltage signal |
| +3 | Quick stop command |
| +4 to +32767 | Reserved |

Monitoring

6 Monitoring

6.1 Objects

2200h Monitoring Values

All monitoring values are provided in the object 2200h („Monitoring values“). The values shown are stored in the respective subindices.

The values are overwritten only in certain time intervals and with selected events around the memory to preserve. These objects are partially stored retentively:

| 2200h | Monitoring values |
|-------|--|
| 01h | Start Stops |
| 02h | Working hours in sec (Dauer drehender Motor) |
| 03h | Uptime in sec (processor enabled) |
| 04h | Temperature absolute minimum |
| 05h | Temperature absolute maximum |
| 06h | Actual temperature |
| 07h | Number of Quick Stops |
| 08h | Power average |
| 09h | Number of rotations |

Status light

There are three status lights, each of which can assume the states green, yellow and red.

The following content has the following color meaning for the traffic light system:

| 2 Dez | 1 Dez | 0 Dez |
|--|---|---|
|  |  |  |

| | Status light |
|-------|----------------|
| 2210h | |
| 00h | Lifetime |
| 2211h | |
| 01h | Temperature |
| 02h | Power |
| 03h | Error Quantity |

7 CANopen SDO-Objects RollerDrive BI

Communication Specified Objects

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|------------------------------------|-----------|-------|-------------|-------------|---------------------|----------|
| 1000h | 00h | Device Type | UINT32 | ro | | | 0x420192 | x |
| 1001h | 00h | Error Register | UINT8 | ro | | | 0 | TM |
| 1002h | 00h | Manufacturer Status Register | UINT32 | ro | | | 0 | TM |
| 1003h | 00h | Pre-defined error field | UINT32 | ro | | | 0 | x |
| 1005h | 00h | COB-ID SYNC Message | UINT32 | rw | | | 0x80 | x |
| 1006h | 00h | Communication Cycle Period | UINT32 | rw | | | 0 | x |
| 1007h | 00h | Synchronous Window Length | UINT32 | rw | | | 0 | x |
| 1008h | 00h | Manufacturer Device Name | String | const | | | EC5000 | x |
| 1009h | 00h | Manufacturer Hardware Version | String | const | 4 Character | 4 Character | 1.00 | x |
| 100Ah | 00h | Manufacturer Software Version | String | const | 4 Character | 4 Character | - | x |
| 1010h | 00h | Store Parameters - Array | UINT8 | const | | | 4 | x |
| | 01h | All Parameters Except NodeID | UINT32 | otw | | | „save“ = 0x65766173 | x |
| | 02h | Communication Parameter (Com) | UINT32 | rw | | | „save“ | x |
| | 03h | Application Parameters (App) | UINT32 | rw | | | „save“ | x |
| | 04h | Manufacturer Parameters ASW (Man1) | UINT32 | rw | | | „save“ | x |
| | 05h | Manufacturer Parameters SSW (Man2) | UINT32 | rw | | | „save“ | x |

ro = Read only

rw = Read / Write

const = Constant

otw = One time write

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|------------------------------------|-----------|-------|------|------|------------|----------|
| 1011h | 00h | Restore Parameters - Array | UINT8 | const | | | 4 | x |
| | 01h | All Parameters Except NodeID | UINT32 | rw | | | "load" | x |
| | 02h | Communication Parameter | UINT32 | rw | | | "load" | x |
| | 03h | Application Parameter | UINT32 | rw | | | "load" | x |
| | 04h | Manufacturer Parameters ASW | UINT32 | rw | | | "load" | x |
| | 05h | Manufacturer Parameters SSW | UINT32 | rw | | | "load" | x |
| 1014h | | COB-ID Emergency Message | UINT32 | rw | | | 0x80 | x |
| 1015h | | Inhibit Time EMCY | UINT16 | rw | | | 0 | x |
| 1016h | 00h | Consumer Heartbeat Time - Array | UINT8 | const | | | 1 | x |
| | 01h | Consumer Heartbeat Time [1] [ms] | UINT32 | rw | | | 0 | x |
| 1017h | | Producer Heartbeat Time [ms] | UINT16 | rw | | | 0 | x |
| 1018h | 00h | Identity Object (Vendor-ID) | UINT8 | const | | | 4 | x |
| | 01h | Vendor-ID | UINT32 | ro | | | 1019 | x |
| | 02h | Product Code | UINT32 | ro | | | 1 | x |
| | 03h | Revision Number | UINT32 | ro | | | 0x00010001 | x |
| | 04h | Serial Number | UINT32 | ro | | | x | x |
| 1019h | 00h | Synchronous Counter Overflow Value | UINT8 | rw | | | 0 | x |
| 1029h | 00h | Error Behavior | UINT8 | const | | | 0 | x |
| | 01h | Communication Error | UINT8 | rw | | | 0 | x |
| | 02h | Specific Error Class | UINT8 | rw | | | 0 | x |

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|---------------------------------|-----------|-------|------------|------------|---------------|----------|
| 1200h | 00h | 1. SDO Server Parameter | UINT8 | const | | | 2 | x |
| | 01h | COB-ID Client -> Server | UINT16 | const | | | 600h + NodeID | x |
| | 02h | COB-ID Server-> Client | UINT16 | const | | | 580h + NodeID | x |
| 1400h | 00h | 1. RPDO Communication Parameter | UINT8 | const | | | 2 | x |
| | 01h | COB-ID | UINT32 | ro | 0x00000001 | 0xFFFFFFFF | 200h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 255 | x |
| 1401h | 00h | 2. RPDO Communication Parameter | UINT8 | const | | | 2 | x |
| | 01h | COB-ID | UINT32 | ro | 0x00000001 | 0xFFFFFFFF | 300h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 255 | x |
| 1402h | 00h | 3. RPDO Communication Parameter | UINT8 | const | | | 2 | x |
| | 01h | COB-ID | UINT32 | ro | 0x00000001 | 0xFFFFFFFF | 400h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 255 | x |
| 1403h | 00h | 4. RPDO Communication Parameter | UINT8 | const | | | 2 | x |
| | 01h | COB-ID | UINT32 | ro | 0x00000001 | 0xFFFFFFFF | 500h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 255 | x |

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|----------------------------|-----------|-------|------|------|------------|----------|
| 1600h | 00h | 1st RPDO mapping parameter | UINT8 | const | | | 1 | x |
| | 01h | 1st mapping object | UINT32 | ro | | | 6040 0010h | x |
| | 02h | 2nd mapping object | UINT32 | ro | | | 6060 0008h | x |
| | 03h | 3rd mapping object | UINT32 | ro | | | 6081 0020h | x |
| | 04h | 4th mapping object | UINT32 | ro | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | ro | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | ro | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | ro | | | 0 | x |
| 1601h | 00h | 2nd RPDO mapping parameter | UINT8 | const | | | 2 | x |
| | 01h | 1st mapping object | UINT32 | ro | | | 6040 0010h | x |
| | 02h | 2nd mapping object | UINT32 | ro | | | 607A 0020h | x |
| | 03h | 3rd mapping object | UINT32 | ro | | | 0 | x |
| | 04h | 4th mapping object | UINT32 | ro | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | ro | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | ro | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | ro | | | 0 | x |
| | 08h | 8th mapping object | UINT32 | ro | | | 0 | x |

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|----------------------------|-----------|-------|------|------|------------|----------|
| 1602h | 00h | 3rd RPDO mapping parameter | UINT8 | const | | | 3 | x |
| | 01h | 1st mapping object | UINT32 | ro | | | 6040 0010h | x |
| | 02h | 2nd mapping object | UINT32 | ro | | | 60FF 0020h | x |
| | 03h | 3rd mapping object | UINT32 | ro | | | 0 | x |
| | 04h | 4th mapping object | UINT32 | ro | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | ro | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | ro | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | ro | | | 0 | x |
| 1603h | 00h | 4th RPDO mapping parameter | UINT8 | const | | | 0 | x |
| | 01h | 1st mapping object | UINT32 | rw | | | 0 | x |
| | 02h | 2nd mapping object | UINT32 | rw | | | 0 | x |
| | 03h | 3rd mapping object | UINT32 | rw | | | 0 | x |
| | 04h | 4th mapping object | UINT32 | rw | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | rw | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | rw | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | rw | | | 0 | x |
| | 08h | 8th mapping object | UINT32 | rw | | | 0 | x |

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|---------------------------------|-----------|-------|------|------|----------------|----------|
| 1800h | 00h | 1. TPDO Communication Parameter | UINT8 | const | | | 6 | x |
| | 01h | COB-ID | UINT32 | rw | | | 0180h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 255 | x |
| | 03h | Inhibit Time [100 µs] | UINT16 | rw | | | 1000 | x |
| | 04h | Reserved | UINT8 | rw | | | 0 | x |
| | 05h | Event Timer [ms] | UINT16 | rw | | | 2000 -> 0x07D0 | x |
| | 06h | SyncStartValue | UINT8 | rw | | | 0 | x |
| 1801h | 00h | 2. TPDO Communication Parameter | UINT8 | const | | | 6 | x |
| | 01h | COB-ID | UINT32 | rw | | | 0280h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 255 | x |
| | 03h | Inhibit Time [100 µs] | UINT16 | rw | | | 1000 | x |
| | 04h | Reserved | UINT8 | rw | | | 0 | x |
| | 05h | Event Timer [ms] | UINT16 | rw | | | 2000 -> 0x07D0 | x |
| | 06h | SyncStartValue | UINT8 | rw | | | 0 | x |
| 1802h | 00h | 3. TPDO Communication Parameter | UINT8 | const | | | 6 | x |
| | 01h | COB-ID | UINT32 | rw | | | 0380h + NodeID | x |
| | 02h | Transmission Type | UINT8 | rw | | | 1 | x |
| | 03h | Inhibit Time [100 µs] | UINT16 | rw | | | 1000 -> 0x03E8 | x |
| | 04h | Reserved | UINT8 | rw | | | 0 | x |
| | 05h | Event Timer [ms] | UINT16 | rw | | | 2000 -> 0x07D0 | x |
| | 06h | SyncStartValue | UINT8 | rw | | | 0 | x |

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|----------------------------------|-----------|-------|------|------|-----------------|----------|
| 1803h | 00h | 4th TPDO communication parameter | UINT8 | const | | | 6 | x |
| | 01h | COB ID | UINT32 | rw | | | 0480h + node ID | x |
| | 02h | Transmission type | UINT8 | rw | | | 255 | x |
| | 03h | Inhibit Time [100 µs] | UINT16 | rw | | | 1000 | x |
| | 04h | Reserved | UINT8 | rw | | | 0 | x |
| | 05h | Event Timer [ms] | UINT16 | rw | | | 2000 -> 0x07D0 | x |
| | 06h | SyncStartValue | UINT8 | rw | | | 0 | x |
| 1A00h | 00h | 1st TPDO mapping parameter | UINT8 | const | | | 5 | x |
| | 01h | 1st mapping object | UINT32 | ro | | | 6041 0010h | x |
| | 02h | 2nd mapping object | UINT32 | ro | | | 6061 0008h | x |
| | 03h | 3rd mapping object | UINT32 | ro | | | 1001 0008h | x |
| | 04h | 4th mapping object | UINT32 | ro | | | 2200 0610h | x |
| | 05h | 5th mapping object | UINT32 | ro | | | 6077 0010h | x |
| | 06h | 6th mapping object | UINT32 | ro | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | ro | | | 0 | x |
| | 08h | 8th mapping object | UINT32 | ro | | | 0 | x |
| 1A01h | 00h | 2nd TPDO mapping parameter | UINT8 | const | | | 2 | x |
| | 01h | 1st mapping object | UINT32 | ro | | | 6041 0010h | x |
| | 02h | 2nd mapping object | UINT32 | ro | | | 6064 0020h | x |
| | 03h | 3rd mapping object | UINT32 | ro | | | 0 | x |
| | 04h | 4th mapping object | UINT32 | ro | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | ro | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | ro | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | ro | | | 0 | x |
| | 08h | 8th mapping object | UINT32 | ro | | | 0 | x |

CANopen SDO-Objects RollerDrive BI

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|----------------------------|-----------|-------|------|------|------------|----------|
| 1A02h | 00h | 3rd TPDO mapping parameter | UINT8 | const | | | 2 | x |
| | 01h | 1st mapping object | UINT32 | ro | | | 6041 0010h | x |
| | 02h | 2nd mapping object | UINT32 | ro | | | 606C 0020h | x |
| | 03h | 3rd mapping object | UINT32 | ro | | | 0 | x |
| | 04h | 4th mapping object | UINT32 | ro | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | ro | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | ro | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | ro | | | 0 | x |
| | 08h | 8th mapping object | UINT32 | ro | | | 0 | x |
| 1A03h | 00h | 4th TPDO mapping parameter | UINT8 | const | | | 0 | x |
| | 01h | 1st mapping object | UINT32 | rw | | | 0 | x |
| | 02h | 2nd mapping object | UINT32 | rw | | | 0 | x |
| | 03h | 3rd mapping object | UINT32 | rw | | | 0 | x |
| | 04h | 4th mapping object | UINT32 | rw | | | 0 | x |
| | 05h | 5th mapping object | UINT32 | rw | | | 0 | x |
| | 06h | 6th mapping object | UINT32 | rw | | | 0 | x |
| | 07h | 7th mapping object | UINT32 | rw | | | 0 | x |
| | 08h | 8th mapping object | UINT32 | rw | | | 0 | x |

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Bootloader objects

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|------------------------|-----------|-------|------|------|---------|----------|
| 1F51h | 00h | Switch bootloader mode | | const | | | | x |
| | 01h | Restart | UINT8 | rw | 0 | 255 | | x |
| 1F80h | 00h | Nmt start-up | UINT32 | rw | | | | x |



Value „1“ in the object ID 1F51h 01h triggers a complete restart of this RollerDrive.

Monitoring

| Object ID | Sub index | Name | Unit | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|------------------------------|------|-----------|-----|----------------------|------|---------|----------|
| 2200h | 00h | Monitoring values | | UINT8 | ro | | | 9 | x |
| | 01h | Start stops | | UINT32 | ro | | | 0 | COS TM |
| | 02h | Working hours | h | UINT32 | ro | | | 0 | COS TM |
| | 03h | Uptime (runtime) | h | UINT32 | ro | | | 0 | COS TM |
| | 04h | Absolute minimum temperature | °C | INT16 | ro | | | 0 | COS TM |
| | 05h | Absolute maximum temperature | °C | INT16 | ro | | | 0 | COS TM |
| | 06h | Actual temperature | °C | INT16 | ro | | | 0 | COS TM |
| | 07h | Number of quick stops | | UINT16 | ro | | | 0 | COS TM |
| | 08h | Power average (mech.) | W/h | UINT8 | ro | | | 0 | COS TM |
| | 09h | Number of rotations | | UINT32 | ro | | | 0 | COS TM |
| 2210h | 00h | Lifetime traffic light | | UINT8 | ro | 0=green; 1=yellow | | 0 | COS TM |
| 2211h | 00h | Health traffic light | | UINT8 | ro | | | 3 | COS TM |
| | 01h | Temperature | | UINT8 | ro | 0 = green | | 0 | COS TM |
| | 02h | Power | | UINT8 | ro | 1 = yellow | | 0 | COS TM |
| | 03h | Error quantity | | UINT8 | ro | 2 = red | | 0 | COS TM |
| 2220h | 00h | Analogue value output | | UINT8 | ro | | | 1 | COS TM |
| | 01h | Analogue voltage [mV] | | INT16 | ro | | | 0 | COS TM |

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Runtime Objects

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|---------------|-----------|-------|------|------|----------|----------|
| 4048h | 00h | Nominal Power | UINT8 | const | | | 20/35/50 | x |

Thresholds

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|--------------------------------|-----------|-------|------|------|---------|----------|
| 4231h | 00h | High temperature warning level | UINT8 | const | | | 2 | x |
| | 01h | Threshold | INT16 | rw | 50 | 115 | 95 | x |
| | 02h | Hysteresis | INT16 | rw | 2 | 50 | 2 | x |

Application parameters

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|--|-----------|-------|-------|-------|---------|----------|
| 4645h | 00h | Positioning Deceleration Ramp (ms/1000rpm) | UINT16 | rw | 0 | 65535 | 100 | x |
| 4650h | 00h | Bus address | UINT8 | const | | | | x |
| | 01h | Static node ID | UINT8 | rw | 0 | 127 | 127 | x |
| | 02h | Actual node ID | UINT8 | ro | 1 | 127 | 127 | x |
| 4651h | 00h | Baud rate | UINT8 | const | 0 | | 2 | x |
| | 01h | CAN | UINT16 | rw | 125 | 250 | 250 | x |
| | 02h | UART | UINT16 | rw | 19200 | 19200 | 19200 | x |
| 4FFEh | 00h | Actual SDO server user | UINT8 | | | | | x |
| 4FFFh | 00h | User login | UINT32 | | | | | x |

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General objects

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|------------------------------|-----------|-----|------|---------|---------|----------|
| 6007h | 00h | Abort connection option code | INT16 | rw | | | 0 | x |
| 6040h | 00h | Control word | UINT16 | rw | | | 0 | RM |
| 6041h | 00h | Status word | UINT16 | ro | | | 0 | TM |
| 6060h | 00h | Mode of operation | INT8 | rw | 0 | 1, 3, 6 | 3 | RM |
| 6061h | 00h | Mode of operation display | INT8 | ro | | | 3 | TM |

Velocity mode

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|--------------------------------|-----------|-----|-------|------|---------|----------|
| 60FFh | 00h | Target Velocity [mm/sec] | INT32 | rw | -3000 | 3000 | 0 | RM |
| 606Bh | 00h | Velocity Demand Value [mm/sec] | INT32 | ro | | | 0 | TM |
| 606Ch | 00h | Velocity Actual value [mm/sec] | INT32 | ro | | | 0 | TM |
| 607Fh | 00h | Max profile velocity [mm/sec] | UINT32 | otw | 0 | 3000 | 2000 | RM |

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Profile position mode

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|-----------------------------|-----------|-------|------|------|----------------|----------|
| 6062h | 00h | Position demand value [inc] | INT32 | ro | | | 0 | TM |
| 6064h | 00h | Position actual value [inc] | INT32 | ro | | | 0 | TM |
| 607Ah | 00h | Target position [inc] | INT32 | rw | | | 0 | RM |
| 6081h | 00h | Profile velocity [rpm] | UINT32 | rw | 0 | 3000 | 0 | RM |
| 6083h | 00h | Profile acceleration* | UINT32 | rw | | | Gear-dependent | RM |
| 6084h | 00h | Profile deceleration* | UINT32 | rw | | | 0 | RM |
| 6098h | 00h | Homing method | INT8 | rw | 37 | 37 | 37 | RM |
| 60E3h | 00h | Supported homing methods | INT8 | const | | | 1 | x |
| | 01h | 1st supported homing method | INT8 | const | | | 37 | x |
| 6099h | 00h | Homing speeds | UINT32 | rw | 0 | 0 | 0 | x |
| 60F2h | 00h | Positioning option code | UINT16 | rw | | | | RM |

*Values also apply in velocity mode.



For the positioning mode, the direction of rotation „clockwise“ (factory setting) must be selected in the default settings!

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Required torque values

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|--|-----------|-----|------|------|---------|----------|
| 6073h | 00h | Max. current (from profile torque mode) [Promille] | UINT16 | rw | 0 | 1000 | 1000 | TM |
| 6077h | 00h | Actual torque value | INT16 | ro | | | | TM |
| 6079h | 00h | DC link circuit voltage (UzK) | UINT16 | ro | 0 | | | TM |

General objects

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|------------------------|----------------|-------|------|------|-----------|----------|
| 6402h | 00h | Motor type | UINT16 | ro | | | 03h | x |
| 6403h | 00h | Motor catalogue number | Visible_String | otw | | | | x |
| 6404h | 00h | Motor manufacturer | String | const | | | Interroll | x |

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Factor Group

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|--|-----------|-------|--------------------|--------------------|--------------------|----------|
| 60A8h | 00h | SI unit position | UINT32 | rw | FDh 01h 00h 00h | FDh 01h 00h 00h | FDh 01h 00h 00h | x |
| 60A9h | 00h | SI unit velocity | UINT32 | rw | FDh 01h 03h 00h | FDh 01h 03h 00h | FDh 01h 03h 00h | x |
| 60AAh | 00h | SI unit acceleration | UINT32 | rw | FDh 01h 57h 00h | FDh 01h 57h 00h | FDh 01h 57h 00h | x |
| 6091h | 00h | Gear Ratio | UINT8 | const | | | 2 | x |
| | 01h | Motor Shaft Revolutions | UINT32 | otw | 9 | 108 | 18 | x |
| | 02h | Driving Shaft Revolutions | UINT32 | otw | | | 1 | x |
| 6092h | 00h | Feed Constant | UINT8 | const | | | 2 | x |
| | 01h | Feed [mm] | UINT32 | otw | | | 157 | x |
| | 02h | Shaft Revolutions | UINT32 | otw | | | 1 | x |
| 607Eh | 00h | Polarity | UINT8 | rw | 0 | 0,64,128,192 | 0 | x |
| 60C5h | 00h | Max Acceleration [mm/sec ²] | UINT32 | rw | | | | x |
| 60C6h | 00h | Max Deceleration [mm/sec ²] | UINT32 | rw | | | | x |

Controlling the power drive system

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|-----------------------|-----------|-----|------|------|---------|----------|
| 6502h | 00h | Supported drive modes | UINT32 | ro | | | 37 | x |

Device information

| Object ID | Sub index | Name | Data type | Acc | Min. | Max. | Default | Mappable |
|-----------|-----------|----------------|-----------|-----|------|------|------------------------|----------|
| 67FEh | 00h | Version number | UINT32 | ro | | | 3, 1, 0 - 00030100h | x |

8 PDO Mapping

| RxPDO Telegramm | Telegrammframe zu sendendes Telegramm | | | | | | | | | |
|-----------------|--|----------------------------|--------|-------------------|-----------------|------------------|--------|--------|--|------------|
| | Index | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | | Byte 7 |
| RxPDO 1 1600h | | 6040h 00h 10h | | 6060h 00h 08h | | 6081h 00h 20h | | | | 200+NodeID |
| RxPDO 1 - 1600h | | Controlword | | Mode of operation | | profile velocity | | | | |
| RxPDO 2 1601h | | 6040h 00h 10h | | | 607Ah 00h 20h | | | | | 300+NodeID |
| RxPDO 2 1601h | | Controlword | | | Target Position | | | | | |
| RxPDO 3 1602h | | 6040h 00h 10h | | | 60FFh 00h 20h | | | | | 400+NodeID |
| RxPDO 3 1602h | | Controlword | | | target velocity | | | | | |
| RxPDO 4 1603h | | Kann frei verwendet werden | | | | | | | | 500+NodeID |
| RxPDO 4 1603h | | | | | | | | | | |

| TxPDO Telegramm | Telegrammframe zu sendendes Telegramm | | | | | | | | | |
|-----------------|--|----------------------------|--------|----------------------------|-----------------------|---------------------|--------|---------------------|--|------------|
| | Index | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | | Byte 7 |
| TxPDO 1 1A00h | | 6041h 00h 10h | | 6061h 00h 08h | 1001h 00h 08h | 2200h 06h 10h | | 6077h 00h 10h | | 180+NodeID |
| TxPDO 1 - 1A00h | | Statusword | | Modes of Operation display | Error Register | Aktuelle Temperatur | | Torque actual value | | |
| TxPDO 2 1A01h | | 6041h 00h 10h | | | 6064h 00h 20h | | | | | 280+NodeID |
| TxPDO 2 1A01h | | Statusword | | | Position actual value | | | | | |
| TxPDO 3 1A02h | | 6041h 00h 10h | | | 606Ch 00h 20h | | | | | 380+NodeID |
| TxPDO 3 1A02h | | Statusword | | | velocity actual value | | | | | |
| TxPDO 4 1A03h | | Kann frei verwendet werden | | | | | | | | 480+NodeID |
| TxPDO 4 1A03h | | | | | | | | | | |

| | Inhibit Time (100ms) | Event Timer (ms) | Bedingung zum senden der Information |
|---------------|----------------------|------------------|---|
| TxPDO 1 1A00h | 100 | 2000 | Wird in allen Zustandsmodi gesendet, wenn sich der Wert ändert. |
| TxPDO 2 1A02h | 100 | 2000 | Wird in allen Zustandsmodi gesendet, wenn sich der Wert ändert. |
| TxPDO 3 1A03h | 100 | 2000 | Wird in allen Zustandsmodi gesendet, wenn sich der Wert ändert. |

Note for sending the RPDOs:

- Evaluate the desired change in the status word or wait min 50ms between sending two commands.

Error codes (from FW version 2.0.1)

9 Error codes (from FW version 2.0.1)

9.1 CiA Errors

| CiA Code | Error / Warning | Description |
|----------|-----------------|---------------------------------|
| 0x0000 | E | Error reset or no warning |
| 0x3210 | E | Supply voltage too high |
| 0x3220 | E | Supply voltage too low |
| 0x4310 | E | Motor temperature too high |
| 0x4320 | E | Motor temperature too low |
| 0x5000 | E | Device hardware error group |
| 0x6010 | E | Restart (powerfail, watchdog) |
| 0x6310 | E | Loss of parameters |
| 0x6320 | E | Inconsistent parameters |
| 0x7121 | E | Motor shaft is blocked |
| 0x7122 | E | Generic motor failure |
| 0x7300 | E | Motor sensor defect |
| 0x8130 | E | NMT heartbeat error |
| 0x8210 | E | PDO not processed, length error |
| 0x8240 | E | Unexpected SYNC data length |
| 0x8250 | E | RPDO timeout |
| 0x8400 | E | Speed regulator failure |
| 0x8600 | E | Position regulator failure |

Error codes (from FW version 2.0.1)

9.2 Manufacturer Errors / Warnings

| Manufacturer Code | Error / Warning | Description |
|-------------------|-----------------|--------------------------------------|
| 0xFF14 | E | Over current regulator input |
| 0xFF15 | E | Over current regulator output |
| 0xFF3C | E | System software error |
| 0xFF3D | E | Application software error |
| 0xFF50 | E | Motor speed error (heavy load) |
| 0xFFA8 | W | Motor temperature close to high |
| 0xFFA9 | W | Motor temperature close to low |
| 0xFFAA | W | Power reduced by temperature limiter |
| 0xFFBC | E | CANopen software error |
| 0xFFBD | W | CANopen software warning |
| 0xFFBE | W | System software warning |
| 0xFFBF | W | Application software warning |
| 0xFFC0 | W | Reorganisation auf NVRAM ASW |
| 0xFFD0 | W | Communication Warning CAN bus |
| 0xFFD1 | W | Warning CAN overrun (objects lost) |
| 0xFFD2 | W | Warning CAN in passive mode |
| 0xFFD3 | W | Warning CANopen protocol |
| 0xFFD4 | W | Motor speed warning (heavy load) |

Error codes (from FW version 2.0.1)

9.3 CANopen abort codes

| CANopen Abort Code | Description |
|--------------------|---|
| 0503 0000h | Toggle bit not alternated |
| 0504 0000h | SDO protocol timed out |
| 0504 0001h | Client / server command specifier not valid or unknown |
| 0504 0002h | Invalid block size (block mode and only in bootloader) |
| 0504 0003h | Invalid sequence number (block mode and only in bootloader) |
| 0504 0004h | CRC error (block mode and only in bootloader) |
| 0504 0005h | Out of memory |
| 0601 0000h | Unsupported access to an object |
| 0601 0001h | Attempt to read a write only object |
| 0601 0002h | Attempt to write a read only object |
| 0602 0000h | Object does not exist in the object dictionary |
| 0604 0041h | Object cannot be mapped to the PDO |
| 0604 0042h | The number and length of the objects to be mapped would exceed PDO length |
| 0604 0043h | General parameter incompatibility reason |
| 0604 0047h | General internal incompatibility in the device |
| 0606 0000h | Access failed due to an Hardware error |
| 0607 0010h | Data type does not match, length of service parameter does not match |
| 0607 0012h | Data type does not match, length of service parameter too high |
| 0607 0013h | Data type does not match, length of service parameter too low |
| 0609 0011h | Sub-index does not exist |
| 0609 0030h | Invalid value for parameter (download only) |
| 0609 0031h | Value of parameter written too high (download only) |
| 0609 0032h | Value of parameter written too low (download only) |
| 0609 0036h | Maximum value is less than minimum value |

Error codes (from FW version 2.0.1)

| CANopen Abort Code | Description |
|--------------------|--|
| 060A 0023h | Resource not available: SDO connection |
| 0800 0000h | General error |
| 0800 0020h | Data cannot be transferred or stored to the application |
| 0800 0021h | Data cannot be transferred or stored to the application because of local control |
| 0800 0022h | Data cannot be transferred or stored to the application because of the present device state |
| 0800 0023h | Object dictionary dynamic generation fails or no object dictionary is present (e.g. object dictionary is generated from file and generation fails because of a file error) |
| 0800 0024h | No data available |

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