

Type 8681

CANopen

Objects

Document version 1.4

Supplement to Operating Instructions

1 History

| Document version | EDS version | Firmware version | Date | Changes |
|------------------|-------------|------------------|------------|---|
| 1.4 | 1.6 | B.00.00.00 | 2018-09-03 | <ul style="list-style-type: none"> - added data types - added 0x2003sub4, 0x2C07sub7 - fixed sub no. of 0x2C07sub4 Valve state in description - added description of objects: 0x2004sub1, 0x2004subE, 0x20F0, 0x2C01, 0x2C02, 0x2C05sub7 |
| 1.3 | 1.6 | B.00.00.00 | 2018-05-23 | Draft version |
| 1.2 | 1.5 | A.80.02.11 | 2017-10-26 | Draft version: Moved some attachments to new chapter "Important information" Changes for Firmware ≥ A.80.02.11 <ul style="list-style-type: none"> - Object 0x2122 (LED Extern Color) is stored persistently |
| 1.1 | 1.4 | A.80.01.00 | 2017-09-28 | Draft version: Changes for Firmware ≥ A.80.01.00 Changed objects: <ul style="list-style-type: none"> - 0x2004sub3 Device Supply Voltage parameter now read only - 0x2500sub1 Feedbacks: UNSIGNED8 instead of INTEGER8, parameter name changed - 0x2501sub1 Current position as REAL32 value in m (instead of UINT8 value in mm), parameter name changed - 0x2540sub1 Valves: UNSIGNED8 instead of INTEGER8, parameter name changed - 0x2C06 Diagnose: bits added for Errorbyte and Info/Warningbyte - Cyclic PDO data (refer to chapter 3.3) Deleted objects: <ul style="list-style-type: none"> - 0x2C03 Feedback Fields: sub1... sub6 (UNSIGNED8 values in 0.1mm) substituted by 0x2C03 sub7... subC (REAL32 values in m) New objects: <ul style="list-style-type: none"> - 0x2120 LED Modi - 0x2122 LED Extern Color - 0x2C03 sub7... subC Feedback Fields as REAL32 values in m |
| 1.0 | 1.1 | A.02.00.00 | 2017-06-20 | Initial draft version |

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2 Important Information

2.1 Baud rates

The used baud rate can be set in *Baudrate* in the Device Communication Object (0x2001sub1) in case the DIP switches for setting the baud rate have the following position:

DIP7 = On, DIP8 = On.

Supported baud rates are specified in the EDS-file.

Possible values are:

| | |
|-------------------------------|---------------|
| 0: 1000 kbit/s | 5: 100 kbit/s |
| 1: 800 kbit/s (not supported) | 6: 50 kbit/s |
| 2: 500 kbit/s | 7: 20 kbit/s |
| 3: 250 kbit/s | 8: 10 kbit/s |
| 4: 125 kbit/s | |

2.2 Resets

A reset can be called by writing the following values in the Device Communication Object (0x2001sub4).

Possible values are:

- 0: No reset
- 1: Communication Reset
- 2: Node reset (restart device)

2.3 Cyclic data

RPDOs (receive data)

- Receive PDO Mapping Parameter 0:
Sub1: Valves (object 2540sub1)

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|----------|-------|-------|-------|-------|------------------|------------------|------------------|
| Not used | | | | | Solenoid Valve 3 | Solenoid Valve 2 | Solenoid Valve 1 |
| | | | | | 0 = OFF, 1 = ON | | |

TPDOs (transmit data)

- Transmit PDO Mapping Parameter 0:
Sub1: Feedbacks (object 2500sub1)

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|----------|-------|-------|-------|-----------------|-------------|-------------|-------------|
| Not used | | | | Position S4 | Position S3 | Position S2 | Position S1 |
| | | | | 0 = OFF, 1 = ON | | | |

- Sub2: Current Position [mm] as UINT8 (object 2501sub1) EDS version < 1.4
- Current Position [m] as REAL32 (object 2501sub1) EDS version ≥ 1.4

3 Objects

For further information about standard CANopen objects see document “Integration of Bürkert devices in CANopen networks”

<https://www.buerkert.de/de/Media/plm/MAN/MA/MAME23-Software-EU-EN.pdf?id=MAN00000000000000001000310294ENI>

Column “access type” describes the general CANopen access rights.

Column “data type” describes the datatype with following used datatype abbreviations:

| Abbreviation | Meaning |
|--------------|--|
| UI8 | Unsigned8 |
| UI16 | Unsigned16 |
| UI32 | Unsigned32 |
| UI64 | Unsigned64 |
| FL32 | Real32 (Float) |
| VSTR | Visible_String (Byte array of max. 19 Bytes, characters coded with “UTF-8”) |
| DOM | Domain |

Following abbreviations are used for expressing conditions:

| Abbreviation | Meaning |
|--------------|-----------|
| != | Not equal |
| == | Equals |

3.1 0x2000 Buerkert Device Description Object

| sub | name | description | access type | data type |
|-----|-----------------------|---|-------------|-----------|
| 1 | Device Name | Unique device name Used to identify the device in a bueS system by name (e.g. Buerkert Communicator) (linked to User Configuration Object) | RO | VSTR |
| 2 | Ident Number | Device ID No. (linked to Common Object) | RO | UI32 |
| 3 | Manufacture Date | Manufacture Date (linked to Common Object) | RO | VSTR |
| 4 | Software Ident Number | ID No. of firmware | RO | UI32 |
| 5 | Software Version | Version No. of firmware | RO | UI32 |
| 6 | Hardware Version | Version No. of hardware | RO | UI32 |
| 7 | Serial Number | Serial No. device (linked to Common Object) | RO | UI32 |
| 8 | Product Code | Manufacturers product code (type number) (linked to Common Object) | RO | UI32 |
| 9 | Product Group | Buerkert specific product group like sensor, actuator, ... Used for bueS system configuration | RO | UI8 |

3.2 0x2001 Device Communication Object

| sub | name | description | | access type | data type | | |
|--|-----------------------------|---|---|-------------|-----------|---|-------|
| 1 | Baudrate | Selectable via DIP switch for setting the baud rate, read at start-up | | RW | UI8 | | |
| | | DIP7 | DIP8 | | | Baudrate | value |
| | | off | off | | | 125 kbaud | 4 |
| | | on | off | | | 250 kbaud | 3 |
| | | off | on | | | 500 kbaud | 2 |
| | | on | on | | | Defined by current value (*) Values are specified by CANopen (details see chapter 2.1) | |
| (*) is overwritten in case of changed DIP switches at start-up | | | | | | | |
| 2 | Address | Device address range 0..127 Behaviour depends on DIP switches for setting the address, read at start-up | | RW | UI8 | | |
| | | DIP 1..6 | CANopen | | | bueS mode | |
| | | 000000 | Node ID software configured by this object(*) | | | Node ID handled automatically | |
| | | Other combinations | Node ID configured by DIP switches | | | | |
| | | (*)Value is overwritten in case of another DIP switch configuration at next startup. A configured value of 0 is treated as Node ID 1. | | | | | |
| 3 | bueS Mode | 0 : CANopen Used for CANopen applications 1: bueS mode CANopen enhanced with Buerkert specific communication parts Read at start-up | | RW | UI8 | | |
| 4 | Reset | Handles different device resets 0: No reset 1: Communication Reset 2: Node reset (restart device) | | RW | UI8 | | |
| 5 | bueS Version | version number of the bueS driver | | RO | UI32 | | |
| 6 | Rx error count | occurred Rx errors since devices lifetime | | RO | UI8 | | |
| 7 | Rx error count max | maximal value of occurred Rx errors | | RW | UI8 | | |
| 8 | Tx error count | occurred Tx errors since devices lifetime | | RO | UI8 | | |
| 9 | Tx error count max | maximal value of occurred Tx errors | | RW | UI8 | | |
| A | CAN operation status | operation status of CAN 4 - stopped 5 - operational 127 - pre-operational | | RW | UI8 | | |
| C | Deallocation delay | delay[ms] that partner allocation waits after remove node before start search again | | RW | UI16 | | |
| D | EDS Version | Version of the EDS file | | RO | UI8 | | |
| E | Producer error field 1-64 | | | RO | UI64 | | |
| F | Producer error field 65-127 | | | RO | UI64 | | |

3.3 0x2002 User Configuration Object

| sub | name | description | access type | data type |
|-----|-----------------------|---|----------------|--------------|
| 1 | Unique Device Name | Taken over to Bürkert Device Description Object during device start. Do not change. | RW | VSTR |
| 2 | Location Information | Additional user information about the devices location | RW | VSTR |
| 3 | User Description | Additional user information about the device | RW | VSTR |
| 4 | Displayed Device Name | Device (TAG) name (is also displayed in Bürkert Communicator) | RW | VSTR |

3.4 0x2003 Error Management Object

| sub | name | description | access type | data type |
|-----|-----------------------------------|--|----------------|--------------|
| 1 | Msg Class Switch off part 1 | Bit field (UINT32) for switching off buerkert message classes. Classes 0...31. 0:on, 1:off | RW | UI32 |
| 2 | Msg Class Switch off part 2 | Bit field (UINT32) for switching off buerkert message classes. Classes 32..63 0:on, 1:off | RW | UI32 |
| 3 | Msg Level Switch off | Bit field (UINT16) for switching off buerkert messages | RW | UI16 |
| 4 | Logbook Download | Download Log in XML format | RO | DOM |
| 6 | Indicator Class Switch off part 1 | Bit field (UINT32) for switching off buerkert indicator classes. Classes 0...31. 0:on, 1:off | RW | UI32 |
| 7 | Indicator Class Switch off part 2 | Bit field (UINT32) for switching off buerkert indicator classes. Classes 32..63 0:on, 1:off | RW | UI32 |
| 8 | Indicator Level Switch off | Bit field (UINT16) for switching off buerkert indicators | RW | UI16 |

3.5 0x2004 Device Status Object

| sub | name | description | access type | data type |
|-----|-------------------------------|--|-------------|-----------|
| 1 | Device Status NamurNe107 | Corresponds to the device status (*) Not PDO mappable. | RO | UI8 |
| 3 | Device Supply Voltage | Supply voltage in volt | RO | FL32 |
| 4 | Operation Time_[s] | Devices operating time counter in seconds | RO | UI32 |
| 7 | Maximum Device Supply Voltage | Max value of devices power supply in volt since start-up | RO | FL32 |
| 8 | Minimum Device Supply Voltage | Min. value of devices power supply in volt since start-up | RO | FL32 |
| E | Trans Mem Status | Represents a combined status and mode of the configuration client. (Not part of CANopen eds file due to inactive configuration client function in case bueS Mode = CANopen) 6 - Client searching for provider 7 - Client is managed by a provider 8 - Changes available 9 - Provider search turned off 10 - Client is waiting for provider 11 - Client has been reconfigured 6, 7, 8, 10: Client On 11: Client Auto switch on 9 : Client Off | RW | UI8 |

(*) Details of Device Status NamurNe107:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|-------|---|-------|---|-------|-------|-------|
| 0 | 0 | Namur mode: 0 – auto 1 – manual 2 – flashing | | Namur state: 0 – diagnose passive (normal) 1 – diagnose active 2 – maintenance required 3 – out of specification 4 – check function (warning) 5 – error | | | |

3.6 0x2010 Physical Group

3.7 0x20F0 Config Client

Not part of CANopen eds file due to inactive configuration client function in case bueS Mode = CANopen.

| sub | name | description | access type | data type |
|-----|------------------|--|-------------|-----------|
| 1 | Reconfig Counter | Counts number of reconfigurations by configuration provider. | RW | UI8 |

3.8 0x2101 Locating Function

Function for locating a device. Device LED blinks several times (max. 10 seconds) by setting call/cancel to 1.

| sub | name | description | access type | data type |
|-----|-------------|-------------------------------|----------------|--------------|
| 1 | call/cancel | <i>bueS internal function</i> | RW | UI8 |

3.9 0x2120 LED Modi (since EDS version 1.4)

Since EDS-Version 1.4:

In case of setting DIP switch color to DIP 1, 2, 3, 4, 5 = ON, DIP 6 = OFF:

(TOP) LED color assignment is configured by this parameter as follows:

| sub | name | description | access type | data type |
|-----|----------|---|----------------|--------------|
| | LED Modi | 0 – NAMUR mode 4 – Fixed color 6 – (TOP) LEDs off | RW | UI32 |

3.100x2122 LED Extern Color (since EDS version 1.4)

Since EDS-Version 1.4:

| sub | name | description | access type | data type | | | | | | | | | | | | | | | | | | | | |
|------------|------------------|---|----------------|---------------|------------|-------|------------|-----|------------|--------|------------|--------|------------|-------|------------|------|------------|------|------------|------|------------|----------|----|------|
| | LED Extern Color | <p><i>In case of</i></p> <p>1. <i>Setting DIP switch color to DIP 1, 2, 3, 4, 5 = ON, DIP 6 = OFF ((TOP) LED color assignment is defined by object 0x2120 LED Modi)</i></p> <p>AND</p> <p>2. <i>Setting object 0x2120 LED Modi to 4 (Fixed Color)</i></p> <p><i>the color of TOP LEDs is controlled externally</i></p> <p><i>(EDS-Version 1.4: not stored persistently)</i> <i>(EDS-Version 1.5 and higher: stored persistently)</i> <i>by writing a corresponding value to this object:</i></p> <table><tr><th>Value</th><th>TOP LED Color</th></tr><tr><td>0x10000001</td><td>White</td></tr><tr><td>0x10000006</td><td>Red</td></tr><tr><td>0x10000005</td><td>Orange</td></tr><tr><td>0x10000004</td><td>Yellow</td></tr><tr><td>0x10000002</td><td>Green</td></tr><tr><td>0x10000003</td><td>Blue</td></tr><tr><td>0x00FFFF00</td><td>Teal</td></tr><tr><td>0x00FF00FF</td><td>Pink</td></tr><tr><td>0x00000000</td><td>LEDs Off</td></tr></table> | Value | TOP LED Color | 0x10000001 | White | 0x10000006 | Red | 0x10000005 | Orange | 0x10000004 | Yellow | 0x10000002 | Green | 0x10000003 | Blue | 0x00FFFF00 | Teal | 0x00FF00FF | Pink | 0x00000000 | LEDs Off | RW | UI32 |
| Value | TOP LED Color | | | | | | | | | | | | | | | | | | | | | | | |
| 0x10000001 | White | | | | | | | | | | | | | | | | | | | | | | | |
| 0x10000006 | Red | | | | | | | | | | | | | | | | | | | | | | | |
| 0x10000005 | Orange | | | | | | | | | | | | | | | | | | | | | | | |
| 0x10000004 | Yellow | | | | | | | | | | | | | | | | | | | | | | | |
| 0x10000002 | Green | | | | | | | | | | | | | | | | | | | | | | | |
| 0x10000003 | Blue | | | | | | | | | | | | | | | | | | | | | | | |
| 0x00FFFF00 | Teal | | | | | | | | | | | | | | | | | | | | | | | |
| 0x00FF00FF | Pink | | | | | | | | | | | | | | | | | | | | | | | |
| 0x00000000 | LEDs Off | | | | | | | | | | | | | | | | | | | | | | | |

3.11 0x2400 Sensor Type

3.12 0x2420 No Measure Values

3.13 0x2421 No Control Values

3.14 0x2500 Feedbacks

Cyclic updated status of feedback signals. It's mapped on TPDO 0 (0x1A00sub1).

| sub | name | description | access type | data type |
|-----|--|--------------------|-------------|-----------|
| 1 | Value (EDS < 1.4) Feedbacks (EDS ≥ 1.4) | Feedbacks bits (*) | RWR | UI8 |

(*) Details of Feedbacks bits:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|----------|-------|-------|-------|-----------------|-------------|-------------|-------------|
| Not used | | | | Position S4 | Position S3 | Position S2 | Position S1 |
| | | | | 0 = OFF, 1 = ON | | | |

3.15 0x2501 Current position

Cyclic updated current position. It's mapped on TPDO 0 (0x1A00sub2).

3.15.1 Position as UINT8 value in mm (EDS version < 1.4)

For firmware revisions < A.80.00.00

| sub | name | description | access type | data type |
|-----|-------|------------------------|-------------|-----------|
| 1 | Value | Current Position in mm | RWR | UI8 |

3.15.2 Position as REAL32 value in m (EDS version ≥ 1.4)

For firmware revisions ≥ A.80.00.00

| sub | name | description | access type | data type |
|-----|------------------|-----------------------|-------------|-----------|
| 1 | Current Position | Current Position in m | RWR | FL32 |

3.16 0x2540 Valves

Cyclic control byte for solenoid valves in automatic mode. It's mapped on RPDO 0 (0x1600sub1).

| sub | name | description | access type | data type |
|-----|---|--|-------------|-----------|
| 1 | Value (EDS < 1.4) Valves (EDS ≥ 1.4) | Solenoid valves control bits (*) in automatic mode | RWW | UI8 |

(*) Details on cyclic solenoid valves control bits:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-----------------|-------|-------|-------|-------|------------------|------------------|------------------|
| Not used | | | | | Solenoid Valve 3 | Solenoid Valve 2 | Solenoid Valve 1 |
| 0 = OFF, 1 = ON | | | | | | | |

3.17 0x2C00 Additional Device Identity

| sub | name | description | access type | data type |
|-----|------------------------------|---|-------------|-----------|
| 1 | Device Ident Number | Buerkert specific device ID No. Value is transferred to Ident Number of Buerkert Device Description Object during start-up. | RO | UI32 |
| 2 | Device Ident Number Customer | Customer specific device ID No. | RO | UI32 |
| 3 | Device Serial Number | Buerkert specific device SN. Value is transferred to Serial Number of Buerkert Device Description Object during start-up. | RO | UI32 |
| 4 | Manufacture Date | Buerkert date of manufacturing Value is transferred to Manufacture Date of Buerkert Device Description Object during start-up. | RO | VSTR |
| 5 | PCB Ident Number | Buerkert specific PCB ID No. | RO | UI32 |
| 6 | PCB Ident Number Customer | Customer specific PCB ID No. | RO | UI32 |
| 7 | PCB Serial Number | | RO | UI32 |
| 8 | PCB Hardware Version | | RO | UI8 |
| 9 | PCB Hardware Index | | RO | UI8 |
| A | Software Version | Firmware version as a readable string | RO | VSTR |

3.18 0x2C01 Life Data

| sub | name | description | access type | data type |
|-----|----------------------------|--|----------------|--------------|
| 1 | Operation Hours Total | | RO | UI32 |
| 2 | Operation Hours Resettable | <i>Can be reset e.g. with Daily Counter Reset Function (refer to 0x2C24)</i> | RO | UI32 |
| 3 | Cycles V1 Total | <i>Switching cycles of solenoid valve V1.</i> | RO | UI32 |
| 4 | Cycles V1 Resettable | <i>Can be reset e.g. with Daily Counter Reset Function (refer to 0x2C24)</i> | RO | UI32 |
| 5 | Cycles V2 Total | <i>Switching cycles of solenoid valve V2.</i> | RO | UI32 |
| 6 | Cycles V2 Resettable | <i>Can be reset e.g. with Daily Counter Reset Function (refer to 0x2C24)</i> | RO | UI32 |
| 7 | Cycles V3 Total | <i>Switching cycles of solenoid valve V3.</i> | RO | UI32 |
| 8 | Cycles V3 Resettable | <i>Can be reset e.g. with Daily Counter Reset Function (refer to 0x2C24)</i> | RO | UI32 |

3.19 0x2C02 Manual Valve Control

| sub | name | description | access type | data type |
|-----|-----------------------------|--|----------------|--------------|
| 1 | Valves Mode | <i>Mode of solenoid valves V1, V2, V3 0 – Automatic mode 1 – Manual mode</i> | RW | UI8 |
| 2 | Valves Manual Control Value | <i>Solenoid valves control bits (*) in manual mode</i> | RW | UI8 |

(*) Details on solenoid valves control bits in manual mode:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|----------|-------|-------|-------|-------|------------------|------------------|------------------|
| Not used | | | | | Solenoid Valve 3 | Solenoid Valve 2 | Solenoid Valve 1 |
| | | | | | 0 = OFF, 1 = ON | | |

3.200x2C03 Feedback Fields

3.20.1 UINT8 value in 0.1 mm (EDS version < 1.4)

For firmware versions < A.80.00.00

| sub | name | description | access type | data type |
|-----|--------------|--|----------------|--------------|
| 1 | TP1 Positive | Feedback field size at top of position S1 in 0.1 mm. (e.g.: a value of 30 corresponds to a size of 3.0 mm.) | RW | UI8 |
| 2 | TP1 Negative | Feedback field size at bottom of position S1 in 0.1 mm. | RW | UI8 |
| 3 | TP2 Positive | Feedback field size at top of position S2 in 0.1 mm. | RW | UI8 |
| 4 | TP2 Negative | Feedback field size at bottom of position S2 in 0.1 mm. | RW | UI8 |
| 5 | TP3 Positive | Feedback field size at top of position S3 in 0.1 mm. | RW | UI8 |
| 6 | TP3 Negative | Feedback field size at bottom of position S3 in 0.1 mm. | RW | UI8 |

3.20.2 REAL32 value in mm (EDS version ≥ 1.4)

For firmware versions ≥ A.80.00.00

| sub | name | description | access type | data type |
|-----|--------------|---|----------------|--------------|
| 7 | TP1 Positive | Feedback field size at top of position S1 in mm. | RW | FL32 |
| 8 | TP1 Negative | Feedback field size at bottom of position S1 in mm. | RW | FL32 |
| 9 | TP2 Positive | Feedback field size at top of position S2 in mm. | RW | FL32 |
| A | TP2 Negative | Feedback field size at bottom of position S2 in mm. | RW | FL32 |
| B | TP3 Positive | Feedback field size at top of position S3 in mm. | RW | FL32 |
| C | TP3 Negative | Feedback field size at bottom of position S3 in mm. | RW | FL32 |

3.21 0x2C04 Service Parameters

| sub | name | description | access type | data type | | | | | | | | | | | | | | | | | | | | | | |
|----------|---|--|-------------|-----------|-----------------|-------|-------|-------|-------|-------|----------|--|--|--|--|----------------|--|--|----|----|----|-----------------|--|--|----|-----|
| 1 | Magnetic Manual Control Active | Activation / Deactivation: 1 - ON, 0 - OFF | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Service Indication Time Active | Activation / Deactivation of service indication after expired time : 1 - ON, 0 - OFF Expired time is counted by "Operating Hours Resettable" (0x2C01 sub 2). If enabled, service indication will be raised after time "Maintenance At Days" (0x2C04 sub 4) expired. | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Service Indication Cycles Active | Activation / Deactivation of service indication after expired solenoid valve cycles V1, V2 or V3 : 1 - ON, 0 - OFF Cycles are counted by "Cycles Vx Resettable" (V1: 0x2C01 sub 4, V2: 0x2C01 sub 6, V3: 0x2C01 sub 8). If enabled, service indication will be raised if at least one of the resettable cycle counter exceeds its corresponding limit "Maintenance At Cycles Vx" (V1: 0x2C04 sub 5, V2: 0x2C04 sub 6, V3: 0x2C004 sub 7) | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Maintenance At Days | Time based service indication interval. Refer to 0x2C04 sub 2 for details. | RW | UI16 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Maintenance At Cycles V1 (x 1000) | Cycle based service indication interval for solenoid valve V1. A value of 10 corresponds to 10 x 1000 = 10000 cycles. Refer to 0x2C04 sub 3 for details. | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Maintenance At Cycles V2 (x 1000) | Cycle based service indication interval for solenoid valve V2. A value of 10 corresponds to 10 x 1000 = 10000 cycles. Refer to 0x2C04 sub 3 for details. | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Maintenance At Cycles V3 (x 1000) | Cycle based service indication interval for solenoid valve V3. A value of 10 corresponds to 10 x 1000 = 10000 cycles. Refer to 0x2C04 sub 3 for details. | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Safety Mode | Behaviour of solenoid valves in automatic mode in case of communication loss / internal error: 0 – Safety Position Solenoid valves are controlled by value from "Valves Safety Position" (refer to object 0x2C04 sub 9) 1 – Last Position Solenoid valves are controlled by hold value "Valves" from before the communication loss. (refer to object 0x2540 sub 1) A communication loss is detected in several ways(*): bueS: Producer is lost. CANopen: The master heartbeat must be observed (by the slave). The master registered its heartbeat information in the slave. (object 0x1016 Consumer Heartbeat Time) A communication loss can only be detected if slave is in operational mode. Same behavior applies by changing to preoperational mode or stopped mode. | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Valves Safety Position | Control bits for solenoid valves safety position (used only in case "Safety Mode" (0x2C04 sub 8) is set to 0 "Safety Position") <table><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr><tr><td colspan="5" rowspan="3">Not used</td><td colspan="3">Solenoid Valve</td></tr><tr><td>V3</td><td>V2</td><td>V1</td></tr><tr><td colspan="3">0 = OFF, 1 = ON</td></tr></table> | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | Not used | | | | | Solenoid Valve | | | V3 | V2 | V1 | 0 = OFF, 1 = ON | | | RW | UI8 |
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | | | | | | | | | | | | | | | | | | | |
| Not used | | | | | Solenoid Valve | | | | | | | | | | | | | | | | | | | | | |
| | | | | | V3 | V2 | V1 | | | | | | | | | | | | | | | | | | | |
| | | | | | 0 = OFF, 1 = ON | | | | | | | | | | | | | | | | | | | | | |
| A | Use Of External Ini S4 (0 - Closer, 1 - Opener) | Real function of the external initiator S4: 0 – Closer (NO), 1 – Opener (NC) | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | |

| sub | name | description | access type | data type |
|----------|--------------------------------------|---|----------------|--------------|
| B | S4 As S1 | Use S4 as S1: 0 – No, 1 – Yes | RW | UI8 |
| E | WMS Filter | Filter for position measuring system. 0 – Standard, 1 – Array, 2 – Special | RW | UI8 |
| F | Service Indication Display Option | Optical display of service indication 0 – Enabled 1 – Disabled 2 – Disabled until next maintenance confirmation by “Confirm Maintenance Function” (object 0x2C27) | RW | UI8 |

(*) to sub 8:

Communication active:

- bueS Partner allocation active and producer found defined by bueS-Map.
- CANopen Master registered its heartbeat information in the slave and slave is in operational mode.

Communication loss:

- bueS Producer lost
- CANopen Slave did not received master heartbeat in time (e.g. master didn't send heartbeat in time).
Slave left operational mode.

3.22 0x2C05 Device Configuration

| sub | name | description | access type | data type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--|--|----------------|--------------|-------|-------|-------|-------|-------|-------|------------|--|--|--|--|--|--|--|-----------|---|---|---|---|---|---|---|-----------------|--|--|--|--|--|--|--|----|-----|
| 1 | DIP Switch CAN | <p>Status of DIP switches for Node ID and baud rate at startup of device.</p> <p>For details refer to operating instructions.</p> <table><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr><tr><td colspan="8">DIP switch</td></tr><tr><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td colspan="8">0 = OFF, 1 = ON</td></tr></table> | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | DIP switch | | | | | | | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 = OFF, 1 = ON | | | | | | | | RO | UI8 |
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DIP switch | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 = OFF, 1 = ON | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | DIP Switch Color | <p>Status of DIP switches for LED color assignment..</p> <p>For details refer to operating instructions.</p> <table><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr><tr><td colspan="8">DIP switch</td></tr><tr><td colspan="2">Not used.</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td colspan="8">0 = OFF, 1 = ON</td></tr></table> <p>Since EDS-Version 1.4:</p> <p>In case of DIP switch setting DIP 1, 2, 3, 4, 5 = ON, DIP 6 = OFF: LED color assignment is configured by parameter LED Modi 0x2120.</p> | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | DIP switch | | | | | | | | Not used. | | 6 | 5 | 4 | 3 | 2 | 1 | 0 = OFF, 1 = ON | | | | | | | | RO | UI8 |
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DIP switch | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Not used. | | 6 | 5 | 4 | 3 | 2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 = OFF, 1 = ON | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | bueS Obj 2580 Use Special Sensor Index | <p>Configuration of consumed PDOs for valve control in automatic mode.</p> <p>0 - Off (for individual connections via bueS map)</p> <p>1 - 0x2500 + NodeID - 1 (for systems with preconfigured gateway)</p> <p>Only relevant in case</p> <p>- bueS Mode (0x2001sub3) == 'bueS' AND</p> <p>- the control head has a fixed device address > 0 (configured by DIP switches).</p> <p>Not part of CANopen eds file.</p> | RW | UI8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

3.23 0x2C06 Diagnose

| sub | name | description | access type | data type |
|-----|------------------|----------------------------------|----------------|--------------|
| 1 | ErrorByte | Description of bits refer to *) | RO | UI32 |
| 2 | Info/WarningByte | Description of bits refer to **) | RO | UI32 |

*) Details of ErrorByte

| Bit | Bitmask | Description | Available since EDS version |
|-----|------------|---|--------------------------------|
| 0 | 0x00000001 | No position reached | 1.1 |
| 1 | 0x00000002 | Bus error | |
| 2 | 0x00000004 | büS: address conflict | |
| 3 | 0x00000008 | büS: PDO producer not found | |
| 4 | 0x00000010 | büS: no cycle data from PDO producer | |
| 8 | 0x00000100 | Memory error device parameter | 1.4 |
| 9 | 0x00000200 | Memory error feedback positions | |
| 10 | 0x00000400 | Memory error factory data | 1.1 |
| 13 | 0x00002000 | Memory error device default data | |
| 16 | 0x00010000 | Memory error device settings bus | |
| 17 | 0x00020000 | Memory error device settings common | |
| 18 | 0x00040000 | Memory error device settings partner allocation | |
| 20 | 0x00100000 | Error measuring power supply | 1.4 |

**) Details of Info/WarningByte

| Bit | Bitmask | Description | Available since EDS version |
|-----|------------|---|--------------------------------|
| 0 | 0x00000001 | -- | 1.1 |
| 1 | 0x00000002 | Solenoid valves in safety position | |
| 2 | 0x00000004 | Service / maintenance required | |
| 8 | 0x00000100 | Memory error live data counters | |
| 12 | 0x00001000 | Config Client enabled | 1.4 |
| 13 | 0x00002000 | Config Client: device configuration not synchronized with Config Provider | |
| 14 | 0x00004000 | Config Client: Config Provider not found | |

3.24 0x2C07 Device State

| sub | name | description | access type | data type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|-----------------------------|--|-------------------|----------------|-------------------|-------------|-------|-----------|-------|---------------|----------|-----------|---|------------|---|--------------------|---|-------------------|----|-----|--|--|--|----|----|----|--|--|--|--|--|-------------------|--|--|--|--|--|--|--|---------------|--|--|----|-----|
| 1 | Mode | <div>Current device mode:</div> <table><tr><td>0</td><td>Automatic mode</td><td>4</td><td>Manual mode</td></tr><tr><td>1</td><td>Test mode</td><td>5</td><td>Autotune mode</td></tr><tr><td>2</td><td>Test mode</td><td>6</td><td>(reserved)</td></tr><tr><td>3</td><td>Magnet tool active</td><td>7</td><td>Device Reset mode</td></tr></table> | 0 | Automatic mode | 4 | Manual mode | 1 | Test mode | 5 | Autotune mode | 2 | Test mode | 6 | (reserved) | 3 | Magnet tool active | 7 | Device Reset mode | RO | UI8 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Automatic mode | 4 | Manual mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Test mode | 5 | Autotune mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Test mode | 6 | (reserved) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Magnet tool active | 7 | Device Reset mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Teach State | <div>current state of Teached Positions S1 ... S3 – bit coded</div> <table><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr><tr><td colspan="5">Not used</td><td colspan="3">Position</td></tr><tr><td colspan="5"></td><td>S3</td><td>S2</td><td>S1</td></tr><tr><td colspan="5"></td><td colspan="3">0 – not teached</td></tr><tr><td colspan="5"></td><td colspan="3">1 – teached</td></tr></table> | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | Not used | | | | | Position | | | | | | | | S3 | S2 | S1 | | | | | | 0 – not teached | | | | | | | | 1 – teached | | | RO | UI8 |
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Not used | | | | | Position | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | S3 | S2 | S1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 0 – not teached | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 1 – teached | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Valves State | <div>Current state of the solenoid valves – bit coded</div> <table><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr><tr><td colspan="5">Not used</td><td colspan="3">Solenoid valve</td></tr><tr><td colspan="5"></td><td>V3</td><td>V2</td><td>V1</td></tr><tr><td colspan="5"></td><td colspan="3">0 – not activated</td></tr><tr><td colspan="5"></td><td colspan="3">1 – activated</td></tr></table> | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | Not used | | | | | Solenoid valve | | | | | | | | V3 | V2 | V1 | | | | | | 0 – not activated | | | | | | | | 1 – activated | | | RO | UI8 |
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Not used | | | | | Solenoid valve | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | V3 | V2 | V1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 0 – not activated | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 1 – activated | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Service Indication State | <div>Current state of service indication</div> <div>0 – disabled</div> <div>1 – enabled</div> <div>2 - enabled and maintenance required</div> | RO | UI8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Current Position [0.1mm] | <div>Current position in 0.1mm</div> <div>A value of 51 corresponds to 5.1 mm.</div> | RO | UI16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

3.25 0x2C10 Maintenance

| sub | name | description | access type | data type |
|-----|-------------------------------|---|----------------|--------------|
| 1 | Last Maintenance Date | | RO | VSTR |
| 2 | Last Maintenance By | | RO | VSTR |
| 3 | Cycles V1 To Next Maintenance | <i>Left cycles of solenoid valve Vx (X=1, 2, 3) to next maintenance notification.</i> <i>A value ≥ 99999999 indicates disabled service notification function for valve cycles. (object 0x2C04sub3 Service Indication Cycles Active).</i> | RO | UI32 |
| 4 | Cycles V2 To Next Maintenance | | RO | UI32 |
| 5 | Cycles V3 To Next Maintenance | | RO | UI32 |
| 6 | OpHours To Next Maintenance | <i>Left operation hours to next maintenance notification.</i> <i>A value ≥ 99999999 indicates disabled service notification function for operation hours (object 0x2C04sub2 Service Indication Time Active).</i> | RO | UI32 |

3.26 0x2C20 AutoTune Function

| sub | name | description | access type | data type |
|-----|-------------|---|----------------|--------------|
| 1 | AutoTune No | Number of Autotune (1 – 6), which shall be started with call / cancel | RW | UI8 |
| 2 | result | 0xFF: function is still running, otherwise function is finished (acyclic value) 0x00: Autotune function successfully finished 0x01: Autotune start failed, Autotune already running. 0x02: Autotune start failed, not all solenoid valves off 0x03: Autotune start failed, invalid AutoTune number 0x10: Autotune error, Teachreset failed 0x11: Autotune error, teaching POS 1 failed 0x12: Autotune error, teaching POS 2 failed 0x13: Autotune error, teaching POS 3 failed 0x21: Autotune error, returning to POS 1 failed 0x22: Autotune error, returning to POS 2 failed 0xFE: Autotune cancelled | RO | UI8 |
| 3 | call/cancel | 1: call the function 0 : finish or aborts the function (has to be set after function is finished, result value is reset to 0xFF) | RW | UI8 |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set AutoTune No
3. Set call/cancel = 1, for starting function
4. Function is finished if result != 0xFF (SDO request required)
5. Finish function (call/cancel = 0) → result will be 0xFF again

3.27 0x2C21 Teach Function

| sub | name | description | access type | data type |
|-----|-------------|--|----------------|--------------|
| 1 | TeachPos | Number of teach position (1, 2 or 3), which shall be taught with call / cancel | RW | UI8 |
| 2 | result | 0xFF: function is still running, otherwise function is finished (acyclic value) 0x00: Teach function successfully finished 0x01: Teach function failed 0x02: Teach function start failed 0x03: Teach function start failed, invalid TeachPos number | RO | UI8 |
| 3 | call/cancel | 1: call the function 0 : finish or aborts the function (has to be set after function is finished, result value is reset to 0xFF) | RW | UI8 |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set TeachPos
3. Set call/cancel = 1, for starting function
4. Function is finished if result != 0xFF (SDO request required)
5. Finish function (call/cancel = 0) → (result will be 0xFF again)

3.28 0x2C22 TeachReset Function

| sub | name | description | access type | data type |
|-----|-------------|--|----------------|--------------|
| 1 | call/cancel | 1: call the function 0 : finish or aborts the function (has to be set after function is finished) | RW | UI8 |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set call/cancel = 1, for starting function
3. Wait 200ms
4. Finish function (call/cancel = 0)

3.29 0x2C23 DeviceReset Function

Attention: Refer to operating instructions of type 8681 before starting this function!

| sub | name | description | access type | data type |
|-----|-------------|---|----------------|--------------|
| 1 | call/cancel | 1: call the function 0: finish or aborts the function (has to be set after function is finished) | RW | UI8 |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set call/cancel = 1, for starting function
3. Wait 200ms
4. Finish function (call/cancel = 0)

3.30 0x2C24 Daily Counter Reset Function

| sub | name | description | access type | data type |
|-----|----------------------------|---|----------------|--------------|
| 1 | Counter Selection Bit Mask | Bit mask, which daily counter(s) shall be reset(*) | RW | UI8 |
| 2 | result | 0xFF: function is still running, otherwise function is finished (acyclic value) 0x00: Function successfully finished 0x01: No counter in Counter Selection Bit Mask selected 0x02: Reset failed 0xFE: Cancelled | RO | UI8 |
| 3 | call/cancel | 1: call the function 0: finish or aborts the function (has to be set after function is finished, result value is reset to 0xFF) | RW | UI8 |

(*) Details of Counter Selection Bit Mask:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|----------|-------|-------|-------|----------------------------------|----------------------------------|-------|-------|
| Not used | | | | Operation hours resettable | (Daily) cycle counter resettable | | |
| | | | | | V3 | V2 | V1 |
| | | | | | 0 – no reset, 1 - reset | | |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set Counter Selection Bit Mask
3. Set call/cancel = 1, for starting function
4. Function is finished if result != 0xFF (SDO request required)
5. Finish function (call/cancel = 0) → result will be 0xFF again

3.31 0x2C26 Factory Reset Function

Attention: Refer to operating instructions of type 8681 before starting this function!

| sub | name | description | access type | data type |
|-----|-------------|---|----------------|--------------|
| 1 | call/cancel | 1: call the function 0: finish or aborts the function (has to be set after function is finished) | RW | UI8 |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set call/cancel = 1, for starting function
3. Wait 200ms
4. Finish function (call/cancel = 0)

3.32 0x2C27 Confirm Maintenance Function

- Resets daily resettable operation hour and solenoid valve cycle counters.
- Stores maintenance date and name of service stuff.
- Resets service parameter Service Indication Display Option (0x2C04subF) to "Enable" (in case it was set to 2 - Disabled until next maintenance confirmation by "Confirm Maintenance Function" (object 0x2C27)).

| sub | name | description | access type | data type |
|-----|------------------|--|----------------|--------------|
| 1 | Maintenance Date | Use format YYYY-MM-DD hh:mm (will be written to 0x2C10sub1 (Last Maintenance Date)) | RW | VSTR |
| 2 | Maintenance By | Maintenance done by (will be written to 0x2C10sub2 (Last Maintenance By)) | RW | VSTR |
| 3 | result | 0xFF: function is still running, otherwise function is finished (acyclic value) 0x00: Function successfully finished 0x01: Error resetting counters 0x02: Error storing maintenance data 0x03: Error resetting service indication display option | RO | UI8 |
| 4 | call/cancel | 1: call the function 0: finish or aborts the function (has to be set after function is finished, result value is reset to 0xFF) | RW | UI8 |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set Maintenance Date
3. Set Maintenance By
4. Set call/cancel = 1, for starting function
5. Function is finished if result != 0xFF (SDO request required)
6. Finish function (call/cancel = 0) → result will be 0xFF again

3.33 0x2C28 Feedback Field Reset Function

Resets the selected feedback field(s) to default values.

| sub | name | description | access type | data type |
|-----|-----------------------------------|--|----------------|--------------|
| 1 | Feedback Field Selection Bit Mask | Bit mask, which feedback fields shall be reset to default values(*) | RW | UI8 |
| 2 | result | <i>0xFF: function is still running, otherwise function is finished (acyclic value)</i> <i>0x00: Function successfully finished</i> <i>0x01: No feedback field selected in counter in Feedback Field Selection Bit Mask</i> <i>0x02: Reset failed</i> | RO | UI8 |
| 3 | call/cancel | <i>1: call the function</i> <i>0 : finish or aborts the function (has to be set after function is finished, result value is reset to 0xFF)</i> | RW | UI8 |

(*) Details of Feedback Field Selection Bit Mask:

| | | | | | | | |
|-------------------------|-------|-------|-------|-------|-----------------|-------|-------|
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| Not used | | | | | Feedback fields | | |
| | | | | | S3 | S2 | S1 |
| 0 – no reset, 1 - reset | | | | | | | |

How to use:

1. Check if unused (call/cancel == 0 ?)
2. Set Feedback Field Selection Bit Mask
3. Set call/cancel = 1, for starting function
4. Function is finished if result != 0xFF (SDO request required)
5. Finish function (call/cancel = 0) → result will be 0xFF again