bürkert
FLUID CONTROL SYSTEMS

MAN 1000310294 EN Version: X Status: RL (released | freigegeben) printed: 13.03.2026

Type CANopen

Network configuration: Integration of Bürkert devices in CANopen networks

Supplement to Operating Instructions

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1 CANopen settings

This chapter describes in brief the steps on how to connect a CANopen device and to start it up.

1.1 Setting the CANopen bus mode on the device

To operate a Bürkert device in a CANopen network, the bus mode must be changed from the standard setting büS to CANopen.

There are different options for the setting depending on the device.

1.1.1 Devices with DIP switch

For devices that have a DIP switch for changing the bus mode:

- Set the DIP switch to CANopen.

The description can be found in the respective operating instructions.

1.1.2 Devices with display

For devices with a display:

- Use the left navigation button to switch to the configuration area.
- Select General settings.

Setting in the menu:

Parameter ⋯▸ büS ⋯▸ Advanced ⋯▸ Bus mode ⋯▸ CANopen

1.1.3 Devices without DIP switch and without display

For devices without a DIP switch and without a display, set the bus mode using the Bürkert Communicator software.

- Select General settings.

Setting in the menu:

Parameter ⋯▸ büS ⋯▸ Advanced ⋯▸ Bus mode ⋯▸ CANopen

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1.2 Setting baud rate and node ID

After selecting the CANopen bus mode, the baud rate must be selected for the device and the node ID must be entered.

Each device in the network has its own unique node ID.
The baud rate is identical for all devices in the network.

There are different options for the setting depending on the device.

1.2.1 Devices with DIP switch

The process for setting the baud rate and node ID is described in the respective operating instructions.

1.2.2 Devices with display

For devices with a display:

- Use the left navigation button to switch to the configuration area.
- Select General settings.

Setting in the menu:

Parameter ····▸ büS ····▸ Advanced ····▸ Baud rate ····▸Select the baud rate ····▸büS address····▸ Enter the node ID

For devices that do not yet have a node ID and are started in büS mode, the node ID is assigned automatically. After switching from büS to CANopen, the node ID remains unchanged. The node ID required for the next steps is stored in the büS address menu.

1.2.3 Devices without DIP switch and without display

For devices without a DIP switch and without a display, set the baud rate and node ID using the Bürkert Communicator software.

- Select General settings.

Setting in the menu:

Parameter ····▸ büS ····▸ Advanced ····▸ Baud rate ····▸Select the baud rate ····▸büS address····▸ Enter the node ID

For devices that do not yet have a node ID and are started in büS mode, the node ID is assigned automatically. After switching from büS to CANopen, the node ID remains unchanged. The node ID is stored in the büS address menu.

The baud rate and node ID can also be assigned using the Layer setting service. The procedure is described in the Layer setting services (LSS) chapter.

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1.3 Setting heartbeat/nodeguarding

Bürkert devices transmit heartbeat messages as standard.

The heartbeat time is 500 ms. If the heartbeat time is changed, it must be entered in ms as SDO in object 0x1017.

If devices support nodeguarding, this can be used instead of Heartbeat. In the case of nodeguarding, configure the objects 0x100C and 0x100D.

1.4 Switching the device to operational

In CANopen mode, the device starts in the "pre-operational" state. In this mode, acyclic communication is possible, but cyclic communication is not. To switch the device to the "Operational" state, the following message must be sent:

Identifier	DLC	Byte 1	Byte 2
0x00	02	01	Node ID

Node ID: unique device address in the CANopen network.

1.5 Display of the device status

In NAMUR mode, the status LED lights up according to NAMUR NE 107, in the colour specified for the device status. The device status depends on the event with the highest priority.

Priority	Colour	Description	Value (bits 0 – 3)
1 – highest priority	red	Failure, error or fault	5
2	orange	Function check	4
3	yellow	Out of specification	3
4	blue	Maintenance required	2
5	green	Diagnostics active	1
6 – lowest priority	white	Diagnostics inactive	0

1.6 Bürkert colour definitions

Predefined colours

off	0x10000000
white	0x10000001
green	0x10000002
blue	0x10000003
yellow	0x10000004
orange	0x10000005
red	0x10000006

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User-defined colours

An RGB code can be set as 0x00BBBGGRR, where BB=blue, GG=green and RR=red, each 0...255 (0x00...0xFF).

turquoise	0x00FFFF00
pink	0x00FF00FF

Note: Some devices only support 0 and 255 for the blue colour.

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2 CANopen basics

Bürkert CANopen devices comply with the CANopen standard in accordance with the following profiles and standards:

- CiA Draft Standard 301; Application layer and communication profile
- CiA Draft standard proposal 305; Layer Settings Service (LSS) and protocols

2.1 Node ID

In a CANopen network, each device must have a unique node ID. The node ID is saved in the device communication object (0x2001) in sub-index 0x02 and can also be changed here.

CANopen also offers the option of changing the node ID via the layer setting services (LSS) (see layer setting services (LSS)).

2.2 Baud rate

The baud rate describes the transmission rate in a CANopen network.

Bürkert devices support the following baud rates:

Baud rate	Value
1 Mbit/s	0
500 kbit/s	2
250 kbit/s	3
125 kbit/s	4
reserved	5
50 kbit/s	6
20 kbit/s	7
10 kbit/s	8

The default baud rate for Bürkert devices is 500 kbit/s. Like the node ID, it is stored in the Device Communication Object (0x2001), but in sub-index 0x01.

As with the node ID, CANopen also offers the option of changing the baud rate via LSS (see Layer Setting Services (LSS)).

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2.3 Layer Setting Services (LSS)

Requirements for connecting CANopen devices to a network:

- All devices must use the same baud rate.
- The node ID of a device must be unique.

If the manual setting cannot be made on the device, it can be made via the Layer Setting Services (LSS).

To use the Layer Settings Service, only the device to be configured may be on the network, as the COB IDs 0x7E5 (request) and 0x7E4 (response) are always used for communication. An LSS message always contains 8 data bytes. Unused bytes must be initialised with 0.

The responses of the device include either a success message or an error message. The error message consists of an error code, which represents the error, and an error extension which supplies specific information about the error.

2.3.1 Example of configuration via LSS

1. Switch devices into configuration mode using the "Switch Mode Global" service; this will switch all devices into the configuration mode:

Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E5	8	0x04	0x01	reserved					

2. Transfer the new baud rate to the device using the "configure bit ziming" service:

Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E5	8	0x13	Table	Index	reserved				

Meaning of table: Indicates which baud rate table is to be used.

Meaning of index: Indicates the index within the baud rate table.

0 is the baud rate table which is defined according to CiA DSP-305:

Index	Baud rate
0	1 Mbit/s
2	500 kbit/s
3	250 kbit/s
4	125 kbit/s
5	100 kbit/s
6	50 kbit/s
7	20 kbit/s
8	10 kbit/s

The response of the device to configure bit timing:

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Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E4	8	0x13	Error Code	Error Exten-sion	reserved				

Meaning of error code: error code

0	= successfully run
1	= baud rate is not supported
2...254	= reserved
255	= special error code, see error extension

Meaning of error extension: manufacturer-specific error code (if error code = 255).

3. If the device responds without an error, the baud rate must be activated using the "activate bit timing" service:

Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E5	8	0x15	Delay		reserved				

Meaning of delay: Relative time until the new baud rate switches on in ms.

4. Transfer the new node ID to the device using the "configure node ID" service:

Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E5	8	0x11	Node ID	reserved					

Meaning of node ID: New node ID for the device (only values between 1 and 127)

The response of the device to "configure node ID":

Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E4	8	0x11	Error Code	Error Exten-sion	reserved				

Error code:

0	= successfully run
1	= node ID invalid
2...254	= reserved
255	= special error code, see error extension

Error Extension: manufacturer-specific error code (if error code = 255)

5. Switch the devices into operation mode using the "switch mode global" service:

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Identifier	DLC	Data							
		0	1	2	3	4	5	6	7
0x7E5	8	0x04	0x00	reserved					

The baud rate and the node ID can be changed independently of each other or re-assigned.

- Change baud rate: To do this, steps 1, 2, 3 and 5 must be run.
- Assign new node ID: To do this, steps 1, 4 and 5 must be run.

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3 Transmission services

3.1 Service Data Object (SDO)

Acyclic data traffic is implemented with the help of SDOs (Service Data Objects). The SDO client sends a request (read or write) to which the SDO server sends a response (read or write).

Read access:

The requested data is located in the last 4 bytes of the message. In the event of an error, the first byte contains the value 0x80. The last 4 bytes contain the error code.

Write access:

If the first byte does not contain the value 0x80, the access was successful. Otherwise, the last 4 bytes contain the error code.

The error definition can be found in CiA Draft Standard 301.

3.2 Process Data Object (PDO)

Process data is transferred cyclically using PDOs (Process Data Objects). A PDO can contain between 1 byte and 8 bytes of data. The arrangement of data on a PDO is described by what is known as "PDO mapping". In order to receive and interpret a PDO, both its COB ID and the "PDO mapping" must be known.

Asynchronous transmission:

The process data is sent when changes are made. The shortest time between two transmissions is described by the "inhibit time", the longest by the "event time".

Synchronous transmission:

The "sync master" controls the process data transfer. Receipt of the synchronisation message triggers the transmission or receipt of the process data.

The predefined connection set only provides for 4 transmit PDOs. For this reason, some devices support what are known as SAM MPDOs (Source Address Mode Multiplexed Process Data Objects). These offer the advantage of transmitting up to 254 process values with just one COB ID. The PDO Scanner List describes the "MPDO mapping".

COB ID	Node ID of producer	Index & sub-index	Data (max. 32 bits)

The sub-index is now changed for each object from the object scanner list and the new data is sent with the same MPDO. The advantage of this is that only one identifier is required for the MPDO in comparison with the use of normal PDOs.

3.3 Synchronisation object (SYNC)

The SYNC telegram is a periodic broadcast telegram and acts as a trigger for CANopen functions. The SYNC telegram allows input data to be transferred synchronously and output data to be activated simultaneously across the entire system.

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3.4 Emergency object (EMCY)

In the event of a fault, the affected device sends an "emergency message". This message can be received by any device on the network.

3.5 Nodeguarding

With Nodeguarding, the Master monitors the CANopen slaves by sending cyclical telegrams to each slave. Each CANopen slave must reply to the nodeguarding telegram with a status telegram.

Nodeguarding enables the master to detect the failure of a CANopen slave.

3.6 Heartbeat

Heartbeat monitoring corresponds to nodeguarding, except that the CANopen master does not generate any request telegrams. The Heartbeat telegram is sent independently by the slave ("producer heartbeat") and can be evaluated in the master ("consumer heartbeat").

3.7 Network Management Services (NMT)

After the device has been successfully initialised, a "boot-up message" is sent. The device is now in the "pre-operational" operating state and is ready for acyclic data traffic (SDO). Cyclic data (PDO) is not transferred.

The NMT command "Operational" additionally activates cyclic data traffic.

The NMT command "Reset communication" restarts the device's communication. "Reset application" restarts the application and communication.

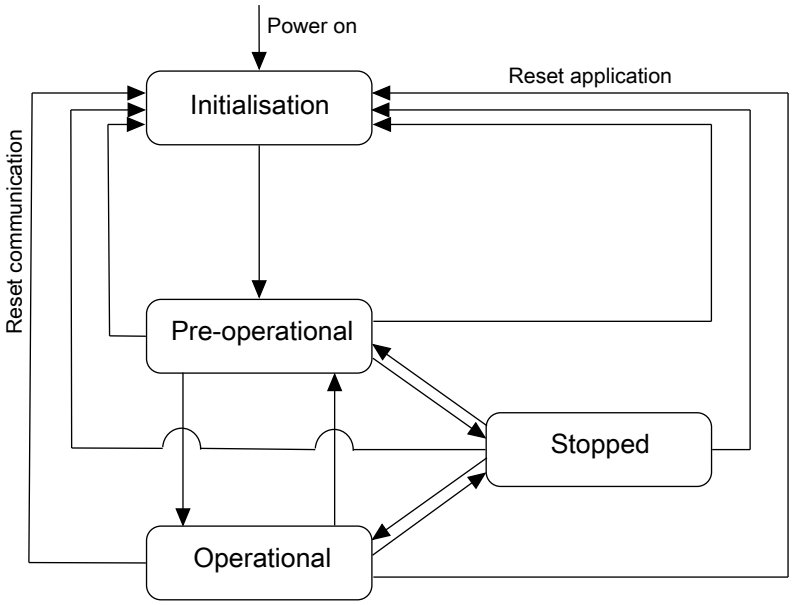

Fig. 1: NMT (http://doc.ingeniamc.com/emcl2/command-reference-manual/communications/canopen-protocol/canopen-objects/nmt/nmt-state-machine), modified

3.8 Predefined connection set

To simplify configuration with simple network structures, CANopen provides predefined identifiers, known as the predefined connection set:

Transmission service	COB ID(s)	Device
NMT	0x00	Receive only
SYNC	0x80	Receive only
EMCY	0x80 + node ID	Send
PDO	0x180 + node ID	TPDO 1
	0x200 + node ID	RPDO 1
	0x280 + node ID	TPDO 2
	0x300 + node ID	RPDO 2
	0x380 + node ID	TPDO 3
	0x400 + node ID	RPDO 3
	0x480 + node ID	TPDO 4
	0x500 + node ID	RPDO 4
SDO	0x580 + node ID	Send
	0x600 + node ID	Receive
Nodeguarding/heartbeat	0x700 + node ID	Send
LSS	0x7E4	Send
	0x7E5	Receive

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4 Object overview

The following objects are supported as standard by a Bürkert CANopen device. Depending on the device type, not all of these objects are always supported.

Index (hex)	Sub-indices (hex)	Name	Access			PDO-mappable
			read	write	constant	
1000	0	Device type	x			
1001	0	Error register	x			
1005	0	COB ID SYNC	x	x		
1006	0	Communication cycle period	x	x		
1008	0	Manufacturer device name			x	
1009	0	Manufacturer hardware version			x	
100A	0	Manufacturer software version			x	
100C	0	Guard time	x	x		
100D	0	Life time factor	x	x		
1014	0	COB ID EMCY	x			
1016	0 – 7F	Consumer heartbeat time	x	x		
1017	0	Producer heartbeat time	x	x		
1018	0 – 4	Identity Object	x			
1200 – 127F	0 – 3	Server SDO parameter	x	(x)		
1280 – 12FF	0 – 3	Client SDO parameter	x	(x)		
1400 – 15FF	0 – 2	Receive PDO communication parameter	x	(x)		
1600 – 17FF	0 – 40	Receive PDO mapping parameter	x	x		
1800 – 19FF	0 – 5	Transmit PDO communication parameter	x	(x)		
1A00 – 1BFF	0 – 40	Transmit PDO mapping parameter	x	x		
2000	0 – 9	Bürkert device description object	x			
2001	0 – D	Device communication object	x	(x)		
2002	0 – 4	User configuration object	x	x		
2003	0 – 4	Error management object	x	(x)		
2004	0 – 13	Device status object	x	(x)		(x)
2101	0 – 1	Locating function	x	(x)		

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Index (hex)	Sub-indices (hex)	Name	Access			PDO-mappable
			read	write	constant	
210A	0 – 1	Trigger maintenance function	x	(x)		
2120	0	LED modes	x	x		
2121	0 – 3	Valve mode configuration	x	(x)		
2122	0	LED extern color		x		
2500 – 253F	0 – 6	Sensor value	x	(x)		(x)
2540 – 257F	0 – 6	Control value	x	(x)		(x)

x – The characteristic applies

(x) – The characteristic may apply (depending on sub-index)

4.1 Detailed description

4.1.1 Object 0x1000 device type

Describes device type and applied profile

Data type: Unsigned32

4.1.2 Object 0x1001 error register

Register for device errors; part of the emergency object.

Data type: Unsigned8

4.1.3 Object 0x1005 COB ID SYNC

Defines the COB ID for the SYNC object and the generation of SYNC telegrams.

Data type: Unsigned32
Default: 0x00000080

4.1.4 Object 0x1006 communication cycle period

The interval between successive SYNC signals in µsec.

Data type: Unsigned32

4.1.5 Object 0x1008 manufacturer device name

Device designation of the manufacturer.

Data type: Visible_String

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4.1.6 Object 0x1009 manufacturer hardware version

Version description of the hardware.

Data type: Visible_String

4.1.7 Object 0x100A manufacturer software version

Version description of the software.

Data type: Visible_String

4.1.8 Object 0x100C guard time

Setting of the nodeguarding time in msec.

Data type: Unsigned16

4.1.9 Object 0x100D life time factor

Setting of a factor according to which the slave must have responded to the nodeguarding telegram.

Data type: Unsigned8

4.1.10 Object 0x1014 COB ID EMCY

Specifies the COB ID for the emergency object.

Data type: Unsigned32
Default: 0x80 + node ID

4.1.11 Object 0x1016 Consumer Heartbeat Time

The Heartbeat times consumed by the master are entered here. Up to 127 devices are possible.

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	127	x	
0x01	Consumer heartbeat time	Unsigned32	0	x	x
0x02	Consumer Heartbeat Time_2	Unsigned32	0	x	x
...	...	...	...	...	...
0x7F	Consumer Heartbeat Time_7F	Unsigned32	0	x	x

4.1.12 Object 0x1017 producer heartbeat time

Setting of the heartbeat time in msec.

Data type: Unsigned16
Default: 500

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4.1.13 Object 0x1018 identity object

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	4	x	
0x01	Vendor ID	Unsigned32	0x39	x	
0x02	Product code	Unsigned32		x	
0x03	Revision number	Unsigned32		x	
0x04	Serial number	Unsigned32		x	

4.1.14 Object 0x1200 – 0x127F server SDO parameter

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	3	x	
0x01	COB ID client to server	Unsigned32	0x600 + node ID	x	(x)
0x02	COB ID server to client	Unsigned32	0x580 + node ID	x	(x)
0x03	Node ID of the SDO client	Unsigned8		x	x

(x) – applies conditionally, depending on whether it is the first server SDO parameter or not

There is one object in the object directory for each available Server SDO Parameter. These objects receive a continuous index, from 0x1200 to maximum 0x127F.

4.1.15 Object 0x1280 – 0x12FF client SDO parameter

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	3	x	
0x01	COB ID client to server	Unsigned32	0x600 + node ID	x	x
0x02	COB ID server to client	Unsigned32	0x580 + node ID	x	x
0x03	Node ID of the SDO server	Unsigned8		x	x

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4.1.16 Object 0x1400 – 0x15FF receive PDO communication parameter

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	2	x	
0x01	COB ID	Unsigned32	0x200 + node ID	x	x
0x02	Transmission type	Unsigned8	0xFE	x	x

There is one object in the object directory for each available receive PDO communication parameter. These objects receive a continuous index, from 0x1400 to maximum 0x15FF. The COB ID is increased by 0x100 for each entry.

4.1.17 Object 0x1600 – 0x17FF receive PDO mapping parameter

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8		x	x
0x01	PDO mapping entry	Unsigned32		x	x
0x02	PDO Mapping Entry_2	Unsigned32		x	x
...	...	...	...	...	...
0x08	PDO Mapping Entry_8	Unsigned32		x	x

There is one object in the object directory for each available receive PDO mapping parameter. These objects receive a continuous index, from 0x1600 to maximum 0x17FF. These mapping parameters may have up to 8 mapping entries, each of which is in a sub-index.

4.1.18 Object 0x1800 – 0x19FF Transmit PDO communication parameter

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	5	x	
0x01	COB ID	Unsigned32	0x180 + node ID	x	x
0x02	Transmission type	Unsigned8	0xFE	x	x
0x03	Inhibit time	Unsigned16	5000	x	x
0x04	Compatibility entry	Unsigned8		x	
0x05	Event timer	Unsigned16	1000	x	x

There is one object in the object directory for each available transmit PDO communication parameter. These objects receive a continuous index, from 0x1800 to maximum 0x19FF. The COB ID is increased by 0x100 for each entry.

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4.1.19 Object 0x1A00 – 0x1BFF transmit PDO mapping parameter

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8		x	x
0x01	PDO mapping entry	Unsigned32		x	x
0x02	PDO mapping entry	Unsigned32		x	x
...	...	...	...	...	...
0x08	PDO Mapping Entry_8	Unsigned32		x	x

There is one object in the object directory for each available transmit PDO mapping parameter. These objects receive a continuous index, from 0x1A00 to maximum 0x1BFF. These mapping parameters may have up to 8 mapping entries, each of which is in a sub-index.

4.1.20 Object 0x2000 Bürkert device description object

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	9	x	
0x01	Device name	Visible_String		x	
0x02	Ident number	Unsigned32		x	
0x03	Manufacture date	Visible_String		x	
0x04	Software ident number	Unsigned32		x	
0x05	Software version	Unsigned32		x	
0x06	Hardware version	Unsigned32		x	
0x07	Serial number	Unsigned32		x	
0x08	Product code	Unsigned32		x	
0x09	Product group	Unsigned8		x	

Description of the sub-indices:

Device name:	Unique device name
Ident number:	Unique ident number of the device
Manufacture date:	Date of manufacture of the device
Software ident number:	Unique ident number of the software
Software version:	Version number of the software
Hardware version:	Version number of the hardware
Serial number:	Unique serial number
Product code:	Unique product code
Product group:	Product group of the device

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4.1.21 Object 0x2001 Device communication object

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	13	x	
0x01	Baud rate	Unsigned8	2	x	x
0x02	Address	Unsigned8		x	x
0x03	büS Mode	Unsigned8	1	x	x
0x04	Reset	Unsigned8	0	x	x
0x05	büS version	Unsigned32		x	
0x06	Rx error count	Unsigned8		x	
0x07	Rx error count max	Unsigned8		x	x
0x08	Tx error count	Unsigned8		x	
0x09	Tx error count max	Unsigned8		x	x
0x0A	CAN operation status	Unsigned8		x	
0x0B	Termination resistor	Unsigned8		x	
0x0D	EDS Version	Unsigned8		x	

Description of the sub-indices:

Baud rate:	Baud rate of the device
Address:	Use "Static node ID" of object 0x2002 (if supported by the device)
büS mode:	Selection between CANopen and büS mode 0 = CANopen 1 = büS
Reset:	Possibility of communication reset or device reset 0 = no reset 1 = communication reset 2 = device reset
büS version:	Version number of the büS
Rx error count:	Counter for Rx errors
Rx error count max:	Maximum number of Rx errors
Tx error count:	Counter for Tx errors
Tx error count max:	Maximum number of Tx errors

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CAN operation status:	Display of the CAN operation status 4 = stopped 5 = operational 127 = pre-operational
Termination resistor:	Switch internal terminating resistor 0 = Inactive 1 = Active
EDS Version:	EDS version used by the device software. Byte 0: Revision Byte 1: Version Example: 50 or 0x32 --> EDS version 3.2

4.1.22 Object 0x2002 User configuration object

Sub-index	Name	Data type	Default	Access	
				read	write
0x00	Number of entries	Unsigned8	4	x	
0x02	Location Information	Visible_String		x	x
0x03	User description	Visible_String		x	x
0x04	Displayed device name	Visible_String		x	x
0x05	Static node ID	Unsigned8	0	x	x

Description of the sub-indices:

Location information:	Description of the physical device location
User Description:	Description of the device
Displayed device name:	Displayed device name (device name in the Bürkert display unit)
Static node ID	Node ID of the device

4.1.23 Object 0x2003 Error management object

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	4	x		
0x04	Logbook download	domain		x		

Description of the sub-indices:

Logbook download:	Logbook in XML format

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4.1.24 Object 0x2004 Device status object

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	17	x		
0x01	Device status Namur Ne107	Unsigned8	0	x		x
0x02	Device temperature	Real32		x		
0x03	Device supply voltage	Real32		x		
0x04	Operation Time_[s]	Unsigned32		x		
0x05	Maximum device temperature	Unsigned16		x		
0x06	Minimum device temperature	Unsigned16		x		
0x07	Maximum device voltage	Real32		x		
0x08	Minimum device voltage	Real32		x		
0x0A	Device current	Real32		x		
0x0B	Maximum device current	Real32		x		
0x0C	Minimum device current	Real32		x		
0x0D	Device boot counter	Unsigned32		x		
0x0E	Trans mem status	Unsigned8		x	x	
0x10	Battery voltage	Real32		x		
0x11	Voltage drop counter	Unsigned32		x		
0x12	Operation time since last boot	Unsigned32	0	x		
0x13	Actuator supply voltage	Real32		x		

Description of the sub-indices:

Device status NamurNe 107:	NAMUR status of the device. See Display of the device status [▶ 7]
Device temperature:	Device temperature in [K]
Device supply voltage:	Supply voltage of the device in [V]
Operation Time_[s]:	Time the device is in operation, in [s]
Maximum device temperature:	Highest temperature ever measured in [K]
Minimum device temperature:	Lowest temperature ever measured in [K]
Maximum device voltage:	Highest supply voltage ever measured
Minimum device voltage:	Lowest supply voltage ever measured
Device current:	Current consumption of the device in [A]
Maximum device current:	Highest current consumption ever measured in [A]
Minimum device current:	Lowest current consumption ever measured in [A]
Device boot counter:	Device start counter

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Trans mem status:	Transferable memory status 0 = Unknown status 1 = Memory available 2 = Memory not available 3 = Memory not available 4 = Memory optional 5 = Memory in progress 6 = Device looking for provider 7 = Device is administered by a provider 8 = Changes available 9 = Provider search was switched off 10 = Device waiting for provider 11 = Device was reconfigured
Battery voltage:	Battery voltage in [V]
Voltage drop counter:	Number of voltage drops since last reboot
Operation Ttme since last boot:	Operating time since last start in [s]
Actuator supply voltage:	Supply voltage of the actuator in [V]

4.1.25 Object 0x2101 Locating function

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	1	x		
0x01	Call/Cancel	Unsigned8	0	x	x	

Description of the sub-indices:

Call/Cancel:	1 = Start the locating function 0 = Stop the locating function

Device LED flashes for approx.10 seconds after starting the function. Before the function can be triggered again, it must first be stopped (set Call/Cancel to 0).

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4.1.26 Object 0x210A Trigger maintenance function

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	1	x		
0x01	Call/Cancel	Unsigned8	0	x	x	

Description of the sub-indices:

Call/Cancel: 1 = Start the maintenance function
0 = Stop the maintenance function

Device is set to maintenance state after starting the function. The device LED is blue in maintenance state. Please note: If an event with higher priority is active, the maintenance state is not displayed on the device status. For a detailed description of the device status, see Display of the device status [▶ 7]

4.1.27 Object 0x2120 LED modes

Behaviour of the device status LED

Data type: Unsigned 32

Default: 0

0	NAMUR mode	Colour depends on device status according to NAMUR NE107
2	Valve mode	Settings from objects 0x2121 will be used (only for valves)
3	Valve mode + warnings	Settings from objects 0x2121 will be used (only for valves)
4	Fixed colour	Setting from object 0x2122 will be used
6	LED off	LED is always off

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4.1.28 Object 0x2121 Valve mode configuration

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	3	x		
0x01	Colour position closed	Unsigned32	0x1000 0002	x	x	
0x02	Colour position between	Unsigned32	0x1000 0000	x	x	
0x03	Colour position open	Unsigned32	0x1000 0004	x	x	

Colour settings for the device status LED in valve mode (object 0x2120 value set to 2 or 3), see Bürkert colour definitions [▶ 7]

Note: Only for valves with 3 positions; valves with more positions can use a device-specific object.

Description of the sub-indices:

Colour position closed:	Colour of the LED when the valve is closed
Colour position between:	Colour of the LED when the valve is in the middle position
Colour position open:	Colour of the LED when the valve is open

4.1.29 Object 0x2122 LED extern colour

Fixed colour setting for the device status LED in fixed colour mode (object 0x2120 value set to 4), see Bürkert colour definitions [▶ 7]

Data type: Unsigned32

Default: 0x10000001

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4.1.30 Object 0x2500 – 0x253F Sensor value

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	6	x		
0x01	Value			x	x	x
0x06	Precision	Real32		x		

Description of the sub-indices:

Value:	Value that can be mapped to a TPDO
Precision:	Accuracy of the value

The sensor value is the process value of a Bürkert device. There is one entry in the object directory for each available sensor value. These objects receive a continuous index, from 0x2500 to maximum 0x253F.

The value objects of a sensor value can be mapped onto the TPDOs and therefore be consumed by other devices in the network.

4.1.31 Object 0x2540 – 0x257F Control value

Sub-index	Name	Data type	Default	Access		PDO mappable
				read	write	
0x00	Number of entries	Unsigned8	6	x		
0x01	Value			x	x	x
0x06	Precision	Real32		x		

Description of the sub-indices:

Value:	Value that can be mapped to an RPDO
Precision:	Accuracy of the value

The control value receives a value, e.g. from another device via a PDO or through user input. There is a continuous index, from 0x2540 to maximum 0x257F, for each available control value.

The value objects can be mapped onto the RPDOs and therefore be consumed by other devices in the network.

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