

Manual

Absolute encoder with CANopen Lift-Protocol DS-417

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1 Version overview

This document is subject to changes. In order to have the most current version please download on www.baumer.com

Document index	Date	Firmware version	CANopen Revision Number Obj. 1018	Author	Changes
0001	11.07.17	From V01-03	0003.0000h	blk	Initial version replaces all draft documents
0002	05.01.18	From V01-03	0003.0000h	blk	Object 1017h Producer Heartbeat-Time pre-configured
0003	21.06.23	From V01-03	0003.0000h	wick	Only 1 PDO PDO mapping new objects

2 Safety and operating instructions

Intended use

- The encoder is a precision measuring device that is used to record positions and speeds. It provides measuring values as electronic output signals for the subsequently connected device. It must not be used for any other purpose. Unless this product is specially labeled, it may not be used for operation in potentially explosive environments.
- Make sure by appropriate safety measures, that in case of error or failure of the encoder, no danger to persons or damage to the system or operating facilities occurs.

Personnel qualification

- Installation and assembly of this product may be performed only by a person qualified in electronics and precision mechanics.

Maintenance

- The encoder is maintenance-free and must not be opened up nor mechanically or electronically modified. Opening up the encoder can lead to injury.

Disposal

- The encoder contains electronic components. At its disposal, local environmental guidelines must be followed.

Mounting

- Solid shaft: Do not connect encoder shaft and drive shaft rigidly. Connect drive and encoder shaft with a suitable coupling.
- Hollow shaft: Open clamping ring completely before mounting the encoder. Foreign objects must be kept at a sufficient distance from the stator coupling. The stator coupling is not allowed to have any contact to the encoder or the machine except at the mounting points.

Electrical commissioning

- Do not proceed any electrical modifications at the encoder.
- Do not proceed any wiring work while encoder is live.
- Do not remove or plug on connector whilst under power supply.
- Ensure that the entire system is installed in line with EMC/EMI requirements. Operating environment and wiring have an impact on the electromagnetic compatibility of the encoder. Install encoder and supply cables separately or far away from sources with high emitted interference (frequency converters, contactors, etc.).
- When working with consumers with high emitted interference provide separate encoder supply voltage.
- Completely shield encoder housing and connecting cables.
- Connect encoder to protective earth (PE) using shielded cables. The braided shield must be connected to the cable gland or connector. Ideally, aim at dual connection to protective earth (PE), i.e. housing by mechanical assembly and cable shield by the downstream devices.

Supplementary information

- The present manual is intended as a supplement to already existing documentation (e.g. catalogues, data sheets or mounting instructions).

3 Product Assignment

3.1 Absolute encoder

Product	Product-Code	Device Name	EDS-file
Absolute encoder multiturn	0x0074	EAMxxx MT Lift	EAMxxx_0x0074_V04.00.eds

4 System Overview

4.1 General

The encoder is a rotary measuring system with a CANopen interface. It supports scaling and presetting.

4.2 Supported Profiles

Following CANopen profiles are supported:

- CiA 301 / Version 4.1 (Communication)
- CiA 305 / Version 1.0 (LSS)
- CiA 417 / Version 2.0 (Encoder Profile)

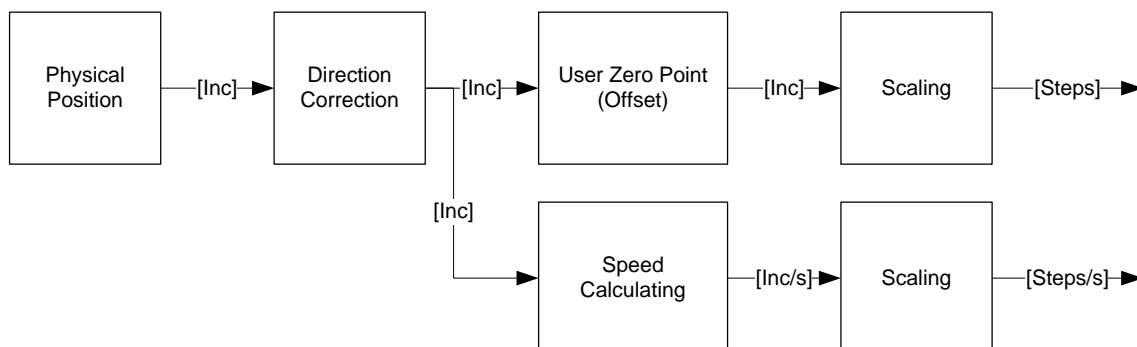
4.3 Supported CANopen Services

Following CANopen services are supported:

- 1 Network Management (according to CiA 301)
- 1 SDO Server (according to CiA 301)
- 1 TPDO (according to CiA 301/CiA 417)
- 1 Emergency Producer (according to CiA 301)
- 1 Heartbeat Producer (according to CiA 301)
- 1 Node guarding (according to CiA 301)
- 1 LSS Client (according to CiA 305)

4.4 Function Principle

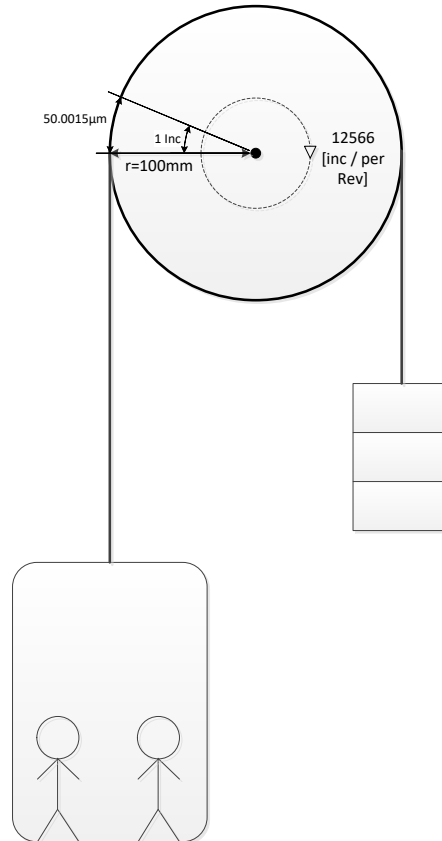
4.4.1 Overview



4.4.2 Scaling

The scaling of the position object can be adapted in the object 6381h and 6384-1h. Speed object can be adapted in the object 6384-2h.

Example for unit settings:



1. Setting measuring units per revolution (6381-1h)
 - a. To set the measuring units per revolution, the resulting measuring step should be considered. The measuring step (6384-1h), has a granularity of $10 \mu\text{m}$.
 - b. The circumference of the bobbin is $U = 2 * \pi * r = 2 * \pi * 100'000 \mu\text{m} = 628318.531 \mu\text{m}$
 - c. For the example above, the measuring units per revolution should be set to

$$((6381 - 1h) = \frac{U}{10 \mu\text{m}} = \frac{628318.531 \mu\text{m}}{10 \mu\text{m}} = 62831.85, \text{ because the object 6381-1h only supports 14-Bit Resolution, the highest possible units per revolution is set -> } (6381 - 1h) = \frac{62831.85}{5} = 12566, \text{ which will result in a position measuring step value of } \frac{U}{6381-1h} = \frac{628318.531 \mu\text{m}}{12566} = 50.0015 \mu\text{m}$$
2. Setting position measure step setting (6384-1h)
 - a. Measuring step setting is $(6384 - 1h) = \frac{U}{6381-1h * 10 \mu\text{m}} = \frac{628318.531}{12566 * 10 \mu\text{m}} = 5$
3. Speed measure step setting (6384-2h)
 - a. To get the user-unit in $[\text{cm/s}]$ the object $(6384 - 2h) = \frac{\text{Unit_User}}{0.1 \text{ mm/s}} = \frac{1[\frac{\text{cm}}{\text{s}}]}{0.1[\frac{\text{mm}}{\text{s}}]} = 10$

4.4.3 Position Range

The range of the position is depending on the position step setting (object 6381h) and number of distinguishable revolutions (object 63C2h).

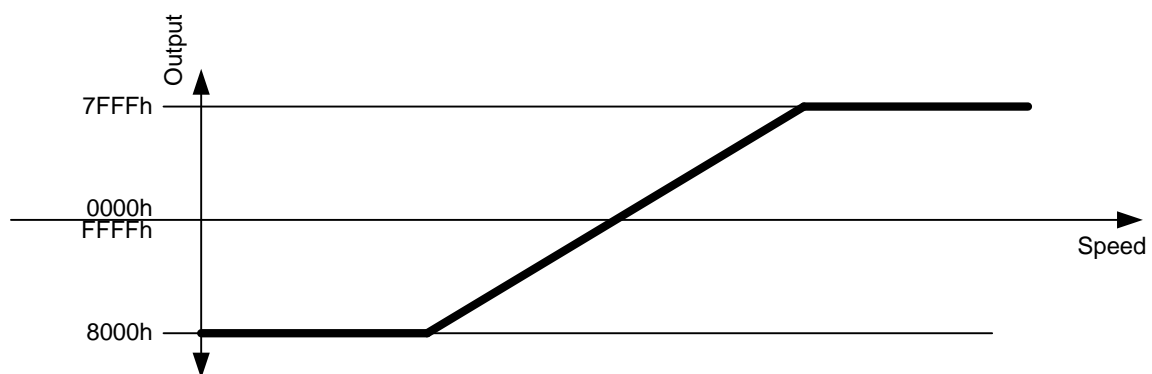
4.4.4 Speed range

0x6390

This object provides a 16-Bit Speed information, which has the user-unit, according to 6384-2h (default = [1 cm/s]).

The range for object 6390h-1 Speed encoder A is -8000h...7FFF'h.

If the scaled speed value exceeds this range, the output is -8000h or 7FFFh (Saturated Logic).



4.5 Encoder as standard component with embedded software used in safety functions

If this standard encoder is used in safety functions, please request the according "Application Note MAGRES EAM" for further information.

5 NMT Service

5.1 Supported commands

Following NMT commands are supported:

NMT Command	Byte 0
NMT Start	0x01
NMT Preoperational	0x80
NMT Stop	0x02
NMT Reset	0x81
NMT Communication Reset	0x82

NMT Frame:

COB ID	Byte 0
node ID	xx

5.1.1 NMT Reset

This NMT command performs a complete reset of the encoder, which can take up to 170 ms until the new bootup-message is sent (restarting of the micro controller, be aware that all unsaved configurations will be lost).

5.1.2 NMT Communication Reset

This NMT command performs a restarting of the CAN Controller, which can take up to 5 ms until the new bootup-message is sent (be aware that all unsaved configurations will be lost). When NMT communication reset is performed, emergency messages (0x6503, 0x6505, 0x1001) are not send again automatically.

5.2 Boot-up message

After a power-on or NMT reset, the device will send a Boot-up message.

COB ID	Byte 0
700h + node ID	00

6 SDO service

6.1 General

The device supports 1 SDO server (Expedited read/write, segmented read)

6.2 Save/load parameters

The device supports saving parameters to a non-volatile memory.

6.2.1 Save

Writing "save" to 1010h-x saves the corresponding objects to the non-volatile memory. After a reset or power-on, the parameters are loaded from the non-volatile memory.

The SDO request to 1010h-x is answered after the saving of the parameters is performed.

6.2.2 Load

Writing "load" to 1011h-x restores the corresponding objects. The parameters are restored after a reset or power-on.

6.2.3 Safe non-volatile operation

To ensure safe non-volatile operation, the user must ensure no power interruption immediately after sending of the save command to object 1010h-x (otherwise, the factory values are restored at the next power up).

7 PDO Service

7.1 General

The device supports TPDO263. PDO is only transmitted in NMT operational mode.

7.2 PDO transmission types

The following transmission types are supported (object 180xh-2):

- Synchronous transmission (1-240)
- Asynchronous transmission (255)
- Manufacturer transmission (254)
- RTR-only transmission, event-driven (253)

The PDO supports all transmission types.

Transmission type 253: The PDO is only transmitted on request (remote transmission request).

Transmission type 255 and 254: The PDO is transmitted timer driven.

Transmission type 1-240: The PDO is transmitted after the n-th sync frame.

Transmission type 1: The PDO is transmitted after one sync frame.

Transmission type 2: The PDO is transmitted after two sync frames.

etc.

7.3 COB-ID

The COB-ID for the PDO is not changeable.

Default Values are:

TPDO263: 18Ch

7.4 PDO mapping

The encoder supports dynamic mapping.

7.4.1 Mappable objects

The following objects are mappable:

Mapping content	Mapping entry	Description
Position value	0x63830120	Object 6383h sub-index 01h, data length 32 Bit
Position value for multisensor devices	0x60200120	Object 6020h sub-index 01h, data length 32 bit
Lift speed	0x63900110	Object 6390h sub-index 01h, data length 16 Bit
Alarms	0x63C70010	Object 63C7h sub-index 01h, data length 16 Bit
Warnings	0x63C50010	Object 63C5h sub-index 01h, data length 16 Bit
Encoder Diagnostic	0x21170010	Object 2117h sub-index 00h, data length 16 Bit
Speed value [rpm]	0x21180010	Object 2118h sub-index 00h, data length 16 bit
Time Stamp [μ s]	0x21200010	Object 2120h sub-index 00h, data length 16 Bit
Safety Word	0x21220010	Object 2122h sub-index 00h, data length 16 bit

To change PDO mapping, disabling the mapping by writing 0 to 0x1A0x-0 is required first. Write the desired mapping entry and enable the mapping again by writing the number of PDO contents to 0x1A0x-0.

7.4.2 Default mapping of absolute encoder

The position will be transmitted in byte 0...3.

ID	DLC	Byte 0	Byte 1	Byte 2	Byte 3
18Ch	4	xx	xx	xx	xx

Byte 0...3: Position value (Object 6383-1h)

7.5 Timing

The minimal cycle time for TPDOs is 1 ms, the default time is set to 0.

7.6 Exceptions of accurate calculation of process data

The following operations could interrupt the accurate calculation of process data such as position, speed, warnings and alarms:

- Changing the scaling parameters

8 Emergency Service

8.1 General

If there is an error on the device, the device commits an emergency message and sets the corresponding bits in the error register (Object 1001h).

Error codes are accessible by the error field (object 1003h-x). A history of maximal 8 error codes is stored in the error field.

8.2 COB-ID

The COB-ID for the emergency message can be modified in object 1014h.

Default Value: 80h + node ID

Changes will be applied immediately.

The COB-ID is stored internally as a difference to the default COB-ID. Example:

Node ID: 1	COB-ID Emergency: 81h (Default value)
	COB-ID Emergency: 87h (Changed by user)
Node ID: 3	COB-ID Emergency: 89h (Adapted automatic)

8.3 Emergency message

The format of the emergency messages is according to CiA 301. Additionally, the encoder sends the warning and alarm fields (object 6503h, 6505h).

The emergency message is transmitted if an error is indicated in the error register.

COB-ID	DLC	Byte0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
80h+node ID	8	Error code		Error register (object 1001h)	Manufacturer specific				
					Alarms 6503h		Warning 6505h		Not used

8.4 Error register

Error register (object 1001h)							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	Communication error	Temperature error			Generic error

8.4.1 Communication error

Communication errors are indicated if the internal CAN message buffers are overflowed or there are malformed CAN frames on the bus. After a communication error the corresponding operation (described in object 1029h-1) is executed.

8.4.2 Temperature error

This error is indicated, when the internal temperature of the encoder is above a certain threshold level, at which the position can't be guaranteed.

8.4.3 Generic error

A generic error is indicated for all other errors.

An encoder specific alarm or warning will also cause a generic error.

After a generic error the corresponding operation (described in object 1029h-2) is executed.

8.5 Error codes

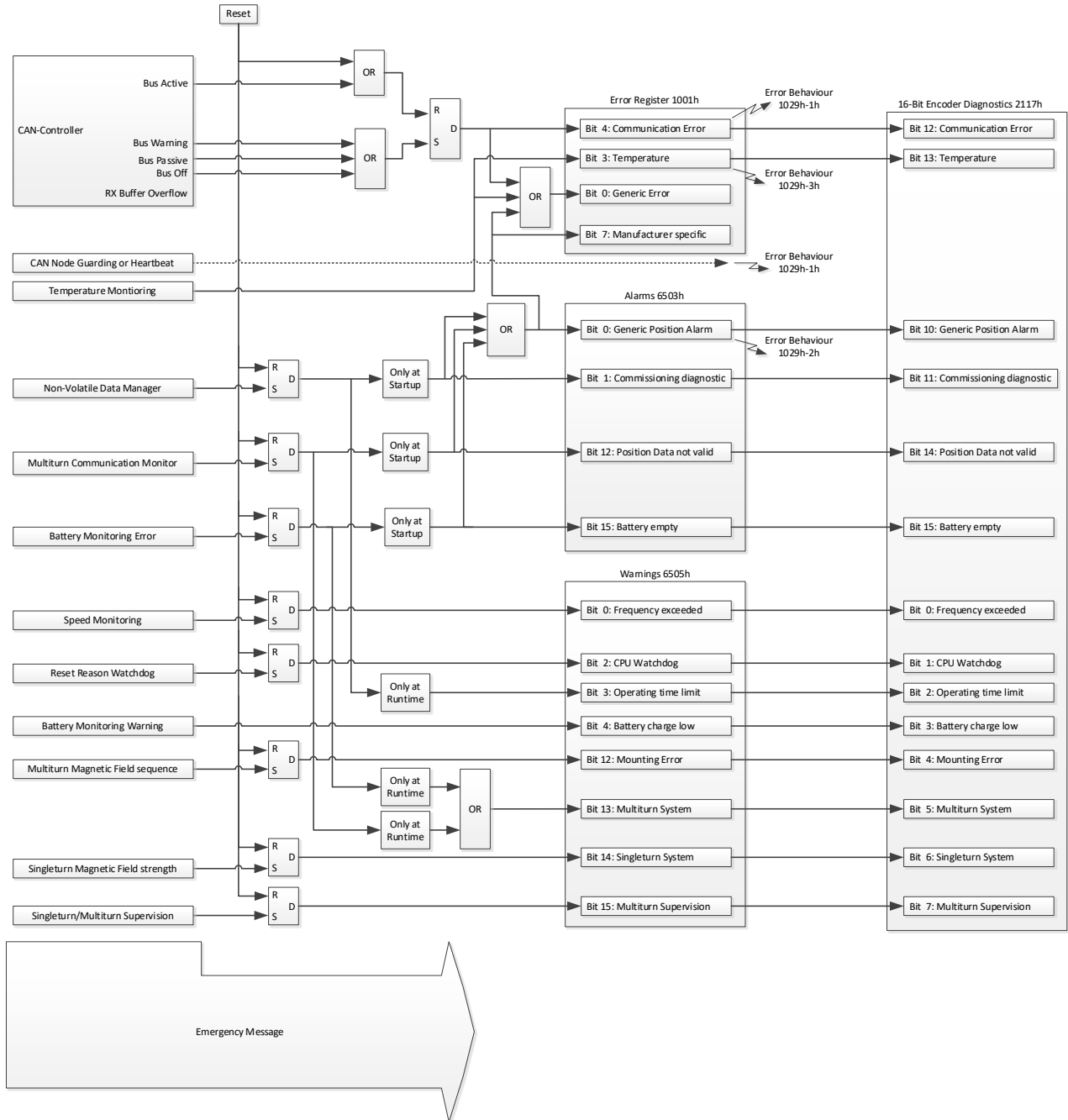
The following error codes are generated by the device:

Error Code (hex)	Meaning
0000h	Error reset or no error
4200h	Temperature out of range
5100h	EEPROM error
6100h	Software fault (watchdog)
8100h	Communication error (bus warning)
8110h	CAN RX overflow
8120h	CAN in error passive mode
8130h	Life guard error or heartbeat error
FF00h	Battery low warning (early warning)
FF01h	Battery empty error
FF02 ... FF03h	Multiturn sensor weak magnetic field warning (position may be incorrect)
FF04h	Internal communication error
FF05h	Speed out of range
FF06h	Singleturn sensor magnetic field out of range
FF07h	Multiturn and singleturn sensor out of sync
FF08h ... FFFFh	Manufacturer reserved error codes

9 Alarms, warnings, errors, emergency messages and error behavior

9.1 Absolute encoder

Dataflow of Error, Alarm, Warning and Emergency messages



9.2 Error behavior

The error behaviors are executed when the corresponding bit in object 1001 Error register is set and the device is in the NMT-State Operational.

Example:

The error behavior 1029h-2 is set to “Change to Pre-Operational” (0). The device is in NMT state Operational

1. Generic error bit is set.
→ The device changes to Pre-Operational
2. The device is forced to NMT state Operational with NMT command Start
→ The device changes again to Pre-Operational if the generic error bit is not cleared.

9.3 0x2117 16-Bit Encoder Diagnostics

In order to get more different objects in one PDO message, the Objects Error (0x1001), Alarm (0x6503) and Warning (0x6505) have been summarized in 2 Bytes.

10 Heartbeat Service

10.1 General

The device supports a heartbeat producer according CiA 301.

10.2 COB-ID

The COB-ID for the heartbeat message is 700h + node ID.

10.3 Timing

The minimal cycle time for heartbeat messages is 1 ms, which can be configured with object 1017h-0

11 LSS slave

11.1 General

The baudrate and node ID can be configured by LSS (according to CiA 305). Another possibility to change the baudrate and node ID is to access to the objects 2100h and 2101h (see object directory).

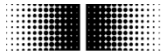
The LSS service is only available in NMT Stopped Mode.

11.2 Supported commands

- Switch state global
- Switch state selective
- Configure node ID protocol
- Configure bit timing parameters
- Store configuration
- Inquire identity vendor-ID
- Inquire identity product code
- Inquire identity revision number
- Inquire identity serial number
- Inquire identity node ID

11.3 LSS address

The needed values for LSS addressing as vendor ID, revision number, product code and serial number are printed on a label on the encoder housing.



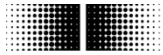
12 Object directory

The following tables provide a summary of all SDO objects supported by the encoder.

Object	Object number in Hex
Name	Object name
Format	U/I = Unsigned/Integer, No. = no of bits, ARR = Array, REC = Record, STR = String
Access	ro = read only, wo = write only, rw = read write, m = mappable
Default	Default value on first init
Save	X = can be stored in the EEPROM
Description	Additional information

12.1 Communication Profile Area

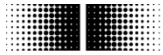
Object	Sub-Index	Name	Format	Access	Default	Save	Description
1000h		Device Type	U32	ro	060001A1h		2 ⁰ .. 2 ¹⁵ ProfilNr = 1A1h = 417 encoder lift 2 ¹⁶ .. 2 ²³ Communication model 2 ²⁴ .. 2 ³¹ virtual device code
1001h		Error Register	U8	ro	0h		Bit0 = Generic error Bit3 = Temperature error Bit4 = Communication error
1003h		PreDefined ErrorField	ARR				
	00h	Largest Subindex	U8	rw	0h		Number of stored messages (0 - 8)
	01h	Last Entry	U32	ro			Newest Error Code
	08h	Oldest Entry	U32	ro			Oldest Error Code
1005h		Sync COB-ID	U32	rw	80h	X	COB ID of the sync object
1008h		DeviceName	STR	ro			Devicename = "EAMxxx Lift"
1009h		Hardware Version	STR	ro			Hardware version in ASCII
100Ah		Software Version	STR	ro			Software version in ASCII
100Ch		Guard time	U16	rw	0h	X	Guard time (actual guard time is Object 100Ch*100Dh [ms])
100D		Life time factor	U8	rw	0h	X	Life time factor
1010h		Store parameters	ARR				
	00h	Largest Subindex	U8	ro	4h		No. of save possibilities 4
	01h	Save all parameters	U32	rw	1h		="evas" (0x65766173) to save
	02h	Communication parameters	U32	rw	1h		="evas" (0x65766173) to save
	03h	Application parameters	U32	rw	1h		="evas" (0x65766173) to save
1011h		Restore default parameters	ARR				
	00h	Largest Subindex	U8	ro	4h		No. of reset possibilities = 4
	01h	All parameters	U32	rw	1h		="daol" (0x64616F6C) to load
	02h	Communication parameters	U32	rw	1h		="daol" (0x64616F6C) to load
	03h	Application parameters	U32	rw	1h		="daol" (0x64616F6C) to load
1014h		Emergency COB-ID	U32	rw	80h + Node-ID	X	COB ID of the emergency object
1017h		Producer heartbeat time	U16	rw	3E8h	X	Producer heartbeat time in ms (0 = disabled)
1018h		Identity object	REC	ro			
	00h	Largest subindex	U8	ro	4h		
	01h	Vendor ID	U32	ro	5Fh		Vendor ID
	02h	Product code	U32	ro			Product code: 74h = EAMxxx Lift
	03h	Revision number	U32	ro			Product revision number
1029h		Error behaviour	ARR				
	00h	Largest Subindex	U8	ro	2h		
	01h	Communication error	U8	rw	1h	X	0h = Change to pre-operational mode
	02h	Generic error	U8	rw	1h	X	1h = No state change
	03h	Temperature error	U8	rw	1h	X	2h = Change to stopped mode



1906h		Transmit PDO263 parameter	REC			X	
	00h	Largest Subindex	U8	ro	5h	X	
	01h	COB ID	U32	ro	18Ch	X	
	02h	PDO type	U8	rw	FFh	X	Transmission type FFh = cyclic
	05h	Event timer	U16	rw	0	X	Cycle time in ms
1B06h		Transmit PDO263 mapping	ARR			X	
	00h	Largest Subindex	U8	rw	4	X	Maximum value is 8
	01h	Content of PDO263	U32	rw	6383'0120h	X	Position encoder
	02h	Content of PDO263		rw	0	X	
	03h	Content of PDO263		rw	0	X	
	04h	Content of PDO263		rw	0	X	
1F80h		NMTStartup	U32	rw	0	X	0h = NMT slave needs to be started by NMT master 8h = NMT slave enters the NMT state <i>Operational</i> autonomously (self starting)

12.2 Manufacturer Specific Profile Area

Object	Sub-Index	Name	Format	Access	Default	Save	Description
2100h		Baudrate	U8	rw	5h	X	0=10 kBit/s 1=20 kBit/s 2=50 kBit/s 3=100 kBit/s 4=125 kBit/s 5=250 kBit/s 6=500 kBit/s 7=800 kBit/s 8=1000 kBit/s The baudrate is activated after a reset or power-on (if parameter is saved to non volatile memory)
2101h		Node ID	U8	rw	4h	X	Node number 1...127 possible The new node ID is activated after a reset or power-on (if parameter is saved to non volatile memory)
2110h		Feature control	U16	rw	0008h	X	Bit 3: CAN Bus Off behavior 1 = Automatic CANopen restarting 0 = Encoder behaves according obj. 1029h
2114h		Manufacturer Reserved	U32	rw	0		
2117h		Encoder diagnostic	U16	ro, m			Encoder diagnostic bits Bit0 = Frequency exceeded Bit1 = CPU watchdog Bit2 = Operating time limit Bit3 = Battery charge low Bit4 = Mounting error Bit5 = Multiturn system Bit6 = Singleturn system Bit7 = Multiturn supervision Bit10 = Generic position alarm Bit11 = Commissioning diagnostic Bit12 = Communication error Bit13 = Temperature Bit14 = Position data not valid Bit15 = Battery empty
2118h		Speed value [rpm]	S16	ro, m			Speed value of Encoder in [rpm]
2120h		Time stamp [us]	U16	ro, m			Time stamp in [us] of current position acquisition
2122h		Safety word	U16	ro, m			Safety word for mapping in TPDO1 NOTE: Use in PDOs with 64-bit data only. Safety word must be placed in bit position 48...63.
2300h		Customer EEPROM	ARR				Customer EEPROM to save any data
	00h	Largest Subindex	U8	ro	4		
	01h	CustomerEEPROM[0]	U32	rw	0	X	
	02h	CustomerEEPROM[1]	U32	rw	0	X	
	03h	CustomerEEPROM[2]	U32	rw	0	X	
	04h	CustomerEEPROM[3]	U32	rw	0	X	
4001h		Speed sampling interval in ms	U16	rw	0Ah	X	The speed sampling interval sets up the sampling interval of the speed calculation Changing this parameter to a value above 4'000 can cause problems (internal overflows) with the speed object (6390h-1)



12.3 Standardized Device Profile Area

Object	Sub-Index	Name	Format	Access	Default	Save	Description
6001h		Lift number	U8	rw	01h	X	Lift Number 1..8, Bit0=Lift 1, Bit1=Lift 2, ...
6020h		Position values for multi-sensor devices	Array		-		Output position value for multi-sensor device NOTE: Only channel 1 is supported.
	00h	Highest	U8	Ro	1h		
	01h	Position value channel 1	U32	ro, m	-		Output position value Internally linked to object 6383h
6380h		Operating Parameter					
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	rw	04h	X	Bit0 = 0 Position CW 1 Position CCW Bit 2 = 0 Scaling function disabled 1 Scaling function enabled
6381h		Resolution	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U32	rw	4000h	X	Resolution in steps/turn 4000h = 16384 = 14 Bit
6382h	00h	Preset value in steps	ARR				
	01h	Largest subindex	U8	ro	01h		
		Position Unit 1	U32	rw	00h	X	Preset in steps → Offset
6383h		Position value	ARR				Position value in [steps] Internally linked to object 6020h-01h
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U32	ro	00h	X	Position value incl. offset in steps
6384h		Encoder measuring step setting	ARR				Position Unit 1
	00h	Largest subindex	U8	ro	03h		
	01h	Measuring step	U32	rw	0Ah	X	Unit of measuring step, multiple of 10 µm
	02h	Speed Measuring step	U32	rw	0Ah	X	Unit of speed, multiple of 0.1 mm/s
	03h	Acceleration Measuring step	U32	rw	01h	X	Unit of acceleration, multiple of 1 mm/s²
6390h		Speed value car	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	ro	00h		Speed (see Object 6384 for unit)
63C0h		Operating Status	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	ro	04h		Bit0 = 0 Position CW 1 Position CCW Bit 2 = 0 Scaling function disabled 1 Scaling function enabled
63C1h		Resolution	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U32	ro	1000h		Resolution in steps/turn
63C2h		Number of distinguishable revolutions	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U32	ro	40000h		Maximum number of rotations
63C4h		Supported Warnings	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	ro	14h		Following warnings are supported: Bit2 = CPU watchdog status Bit4 = Battery charge
63C5h		Warnings	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	ro	00h		Following warnings are supported: Bit2 = CPU watchdog status Bit4 = Battery charge
63C6h		Supported Alarms	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	ro	1001h		Following alarms are supported: Bit0 = Position-Error Bit12 = Data Not Valid Encoder A
63C7h		Alarms	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U16	ro	00h		Following alarms are supported: Bit0 = Position-Error Bit12 = Data Not Valid Encoder A
63C8h		Operating Time	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U32	ro	00h		Time in 1/10 hours since last Reset
63C9h		Offset Wert	ARR				
	00h	Largest subindex	U8	ro	01h		
	01h	Position Unit 1	U32	ro	00h		Offset calculated from Preset (6382 h)

13 Applications

Changing the node ID and baud rate with LSS

The node ID and baud rate can be changed without having to use these to address the encoder. With the LSS service, the sensors are addressed and configured via the product code, revision no., vendor ID and serial number.

Changing the node ID (node no.)

The node ID can be changed in object 2101h between 1 and 127. A save routine should then be executed using object 1010h. On the next initialization, the encoder logs on with the new node ID.

Changing the baud rate

The baud rate can be changed in the object 2100h. An index is written into the object, not the effective baud rate.

The baud rate now still has to be saved using object 1010-1. On next initialization, the encoder logs on to the new baud rate. However, before this the baud rate of the master should be changed.

14 Discrepancies to the CIA specifications

Object	Sub-Index	Name	Discrepancy
0x1029	1	Error behavior	Default Value is 1 instead of 0 (Do not change NMT-State on Communication-Errors.
	3	Error behavior	Default Value is 1 instead of 0 (Do not change NMT-State on Communication-Errors.
0x63C2	0	Number of distinguishable revolutions	Unsigned32 instead of Unsigned 16 due to 18-Bit Multiturn resolution.
1B06h	0	Transmit PDO263 mapping	Speed object 6390h is additionally mapped to PDO

A. Appendix

a. Pin Assignments

Assignment cable (connection – L)

Cable colour	Signal
grey	CAN_GND
brown	+Vs
white	0 V
green	CAN_H
yellow	CAN_L

Pin assignment connector 1 x M12 (connection – N)

Pin	Signal
1	CAN_GND
2	+Vs
3	0 V
4	CAN_H
5	CAN_L

