

RELEASE INFORMATION
OPTOCODE-II-CAN-ENCODER LINE

Dear Customer

This document informs you about the new encoder-line OCD II CANopen, that replaces the older OCD CAN series since the beginning of 2010. As you perhaps recognized, the received encoder has a different type key and is shorter than before.

In the past we were forced to overhaul and redesign our CANopen encoder series, due to discontinuation and availability of some electronic components. This was also an attractive opportunity to improve the functionality of our CAN encoders series.

Additionally we changed some details to gain conformity to manufacturer spanning standards released by the CAN in Automation e.V. user group. Unfortunately, these changes can lead to minor incompatibilities to the OCD version before. We expect, that these incompatibilities get noticed by only a few customers, who use the CAN communication in a specific way. In these cases, we are able to provide a simple procedure to set the new OCD-II-CA into a compatibility modus, that emulates the old behaviour. Several field tests at customers have successfully been completed.

The following pages will inform you about:

- **Enhanced Functionality**
- **Important Enhancement of the Product Portfolio (Through Hollow Shaft Encoder)**
- **Conformity to manufacturer spanning Standards and Device Profiles**
- **Simplified Product Range and consistent Typekey**
- **10 mm shorter housing**

Please find the new datasheets and manuals on our homepage. For the beginning the datasheets of the older OCD series will stay on the website.

If you have questions or problems please, do not hesitate to contact your Posital contact person. We want to offer you our best support in order to have a smooth and successful transition towards our new OCD II series.

With kind regards

Your Posital Team

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Technical information

1 Enhanced Functionality

The new CA-encoder line will have enhanced functionality, as the following table shows:

- Layer Setting Services
- Velocity- and Acceleration-output
- Eight additional software programmable Cams
- Verify Configuration (Object 1020h)
- Customer specific data storage (4 Objects)
- Bootloader
- Event-triggered PDO
- Internal terminal resistor, controllable via SDO

1.1 Layer Setting Services

The abbreviation LSS stands for Layer Setting Services and is an extension packet of the CANopen-Stack. This packet provides functions to find not configured encoders or encoders with unknown configuration in a CANopen network. This can be unequivocally done by vendor-ID, product code, serial- and revision number to set a new baud rate and node number.

1.2 Velocity- and Acceleration-output

The new encoder line will be able to calculate the velocity and acceleration in real time and transmit it to the control.

1.3 Eight additional software programmable Cams

The software of the encoder will simulate eight cams, whose value is free programmable. The reaching of these values will effect a message to the control.

1.4 Verify Configuration (Object 1020h)

This additional object allows an easy administration of parameter configuration. A time stamp will be stored in this object with every reconfiguration. After a reenergising of the network the control can verify if any changes had been done.

1.5 Customer specific data storage

The encoder provides a data area, that can be used by the customer for his own purposes e. g. to cache process data like position values.

1.6 Bootloader

A bootloader allows to reprogram the encoder directly via the CAN Bus. This function can be used for firmware updates.

1.7 Event-triggered Process Data Object (PDO)

This function gives the possibility to transmit process data depending on events. E. g. position values can be sent with a change of the position.

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1.8 Internal terminal resistor, controllable via SDO

A CAN-bus-terminal resistor of 120Ohm will be integrated in the new encoder series. The resistor can be switched galvanically isolated via object 3002h. The galvanic isolation is realized by MOS-FET.

2 Simplification of the type key

2.1 New type key for CAN encoders

The notations C2, C5 and C6 have their origin in technology. The type key describes internal functional groups, without relevance for the customer. Mostly it leads to redundant information in the type key. The functional groups will be replaced by one single PCB, that fulfils all functions and hence leads to a simplification. Generally the transfer can be done by replacing C2, C5 and C6 by the letters CA. Please note, that the CA version is not fully downwards compatible. For reference see info in chapter 3.

The following examples show the transcode (x is a wildcard, that replaces parameters, that are not important in this context).

OCD-**C2**B1B-xxxx-xxxx-**0CC**→ OCD-**CAA1**B-xxxx-xxxx-**XXX**

The old C2-Typekey contains redundant information. Both C2 and 0CC mean connection cap. In the new encoder line, the software-interface (CAN) and the electrical interface will be separated clearly. The last three digits will contain additional information concerning the connection cap. For more details see chapter "Integration: Set Encoder + Connection Cap".

OCD-**C5**B1B-1x1x-xxxx -xxx→ OCD-**CAA1**B-1x1x-xxxx -xxx

The C5 version was a multiturn encoder with plug or cable exit.

OCD-**C6**B1B-001x-xxxx -xxx→ OCD-**CAA1**B-001x-xxxx -xxx

The C6 encoder can be recognised by the singleturn resolution.

2.2 Integration: Set Encoder + Connection Cap

We are about to restructure our typekey for connection cap encoders as well. The introduction will be in line with the new CANopen encoder series beginning of September. Currently this product type key is described by: „0149000090 Set encoder + connection cap“ where different encoder types cannot be distinguished at a glance.

On request of some customers, we will combine the encoder type key and the connection cap type key into one as follows:

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As an example the set 0149000090: Set OCD-C2B1B-1213-C100-0CC + AH58-B1CA-3PG should be considered.

The future type key will be generated by adding to the old encoder type key a new electrical connection class called 'connection cap', indicated by the letter 'H' and two more digits which result from the first two letters of the electrical interface from the old type key of the connection cap,

OCD-CAA1B-1213-C100-HXX + AH58-B1CA-3PG,

resulting in the final new type key:

OCD-CAA1B-1213-C100-H3P

IMPORTANT:

To avoid wrong orders, the type key ending with -0CC will not exist any longer. In case of repair and replacement the encoder with the ending ' -HCC ' has to be ordered. Replacement means, that the old connection cap remains at the customer and an encoder without connection cap will be ordered.

2.2 Integration: Set Encoder + Reducing Adapter

The application of a reducing adapter allows the reduction of the diameter of a blind hollow shaft encoder. It is reducible down to 6mm and is currently handled as 'Set Encoder + Reducing Adapter'. Until now, this was handled as "Set Encoder + Reducing Adapter".

In future the reduced inner diameter will become an integral part of the encoder type key:

Example::

0149000039 Set encoder + Reducing adapter

(Full type key is 'Set OCD-C5B1B-1213-B150-PA9+ Reducing adapter RR12')

will become:

OCD-CAA1B-1213-**B120**-PA9

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2.3 Ordering description:

Description	Type key		
Optocode	OCD-	CA A1 B -	
Interface	CANopen	CA	
Version		A1	
Code	Binary	B	
Revolutions (Bits)	Singleturn	00	
	Multiturn (4096 revolutions)	12	
	Multiturn (16384 revolutions)	14	
Steps per revolution	4096 (0,09°)	12	
	8192 (0,04°)	13	
	65536 (0,005°)	16	
Flange	Clamp flange	C	
	Synchro flange	S	
	Through Hollow Shaft	T	
	Blind shaft	B	
Shaft diameter	06 mm	06	
	10 mm	10	
	12 mm (Through Hollow Shaft)	12	
	15 mm (Hollow shaft)	15	
Mechanical options	without	0	
	Shaft sealing (IP66)	S	
	Stainless steel version*	V	
	Heavy Duty	H	
	Customized	C	
Connection	Cap encoder without connection cap*	HCC	
	Cap encoder with three PG cable glands in connection cap	H3P	
	Cap encoder with two M20 cable glands in connection cap	H2M	
	Cap encoder with one M12-connector connection cap	H1B	
	Cap encoder with two M12-connector connection cap	H2B	
	Cable exit 1m, radial, open cable ends	CRW	
	Cable exit 1m, axial, open cable ends	CAW	
	Two 5pin. M12-Connectors	PRN	
	Connector exit, radial, 5 pin male M12	PRM	
	Connector exit, axial, 5 pin male M12	PAM	
Connector exit, axial, 9 pin D-Sub	PA9		

* for the function of the encoder a connection cap is needed. To order this encoder type only makes sense for spare part / replacement usage.

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3. Conformity to CiA-Norm and Compatibility

To guarantee conformity to CiA standard the encoders had to be changed in a way, that they are not fully compatible to the old types anymore.

Overview of the incompatibilities:

- LED-behaviour
- Object 1802h second TPDO
- Object 1000h Device Type is not 196h
- Restore command
- BCD-switch position 9 in the connection cap

3.1 LED-behaviour

The behaviour of the diagnosis and error LEDs was modified to fulfil the DR303-3 CANopen Indicator Specification of the CiA-organisation:

CAN Run LED	State	Description
Flickering	AutoBitrate/ LSS	The auto-bitrate detection is in progress or LSS services are in progress (alternately flickering with run LED) ₁
Blinking	PREOPERATIONAL	The device is in state PREOPERATIONAL
Single flash	STOPPED	The device is in state STOPPED
Double flash		Reserved for further use
Triple flash	Program/ Firmware download	A software download is running on the device
On	OPERATIONAL	The device is in state OPERATIONAL

ERR LED	State	Description
Off	No error	The device is in working condition
Flickering	AutoBitrate/ LSS	The auto-bitrate detection is in progress or LSS services are in progress (alternately flickering with run LED) ₁
Blinking	Invalid Configuration	General configuration error
Single flash	Warning limit reached	At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames)
Double flash	Error control event	A guard event (NMT-slave or NMT-master) or a heartbeat event (heartbeat consumer) has occurred
Triple flash	Sync error	The sync message has not been received within the configured communication cycle period time out (see object dictionary entry 1006h)
Quadruple flash	Event-timer error	An expected PDO has not been received before the event-timer elapsed
On	Bus off	The CAN controller is bus off

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3.2 Boot-up-time

The encoder line needs less time to send the Boot-Up message after switching on.

	old OCD-series	new OCD-II-series
Boot-up-time	Ca. 3000ms	Ca. 250 ms

3.3 Object 1802h

In the past the second PDO could be parameterised by the object 1801h and 1802h. This is not consistent with the CiA standards and will be ended with the new encoder line. This means in the future the second PDO can only be parameterised via object 1801h.

New versions

	C6, CA (CiA-Conform)	Mode	COB-ID
1800h	PDO1	Asynchronous	180h
1801h	PDO2	Cyclic	280h
1802h	PDO3	Optional Cyclic (not used in C6)	380h

Old versions

	C2 and C5	Mode	COB-ID
1800h	PDO1	Asynchronous	180h
1801h	PDO2	Cyclic	Not used!
1802h	PDO2	Optional Cyclic (used in C2/C5)	280h

3.4 Objekt 1000h Device Type is not 196h

Object 1000h contains a coded description of CAN devices. Until now 196h was written to all encoder types. According to the standards singleturn and multiturn must be distinguished:

- Singleturn → 10196h
- Mutliturn → 20196h

3.5 Restore Command

In the past the restore command set the encoder to customised default values. The restore command sets the encoder to POSITAL default values, which are defined in the user manual. Communication parameters like node number and baud rate are not restored.

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3.6 Connection Cap BCD-switch setting “9”

The, former undefined, BCD-switch setting “9” in the connection cap is used to set the encoder in a mode, that ignores the switch setting for baud rate and node number. The parameters can be modified by SDO messages and LSS, only.

3.7 C2-C5-Work-around

With little limitations, the new OCD-II-encoder line will be compatible to the current version. It will be possible to use the old EDS-file for configuration purposes in the PLC with the new encoder and no errors will occur. Merely the enhanced functions, like velocity- and acceleration-output, will not be available.

In case for unexpected problems, there is the possibility to set the CA-encoder in a compatibility mode, that will restore the old C2-C5-behavior.

There are the following procedures to set this mode:

- Manual, with the BCD-switch in the connection cap:
 - Remove cap from encoder
 - Set node number 97
 - Reconnect connection cap → Both LEDs will glow in red.
 - Remove connection cap again and set back to the needed node number
 - Reconnect connection cap → C2-C5-Behavior
- Via SDO-commando (Software):
 - Write the security code 47111147h to object 3030h subindex 0h.
 - Set object 3030h subindex 1h to „ONE“
 - Hard- or Software RESET

3.8 Fully software compatible CA-variants for C2, C5 und C6 (e.g. for spare parts)

In principle it is still possible to order CA types which are fully software back compatible to the old C2 and C5 versions. (CA is already fully software back compatible to C6). This is done by adding 2 more CA variants:

OCD-**CAC2**B-xxxx-xxxx-xxx

These additional CA variants should only be ordered in exceptional cases (e.g. for repairs) as we would like to minimize the numbers of variants that we offer.