

# AG FB-CAN

## Absolute encoder viva CAN



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## Further descriptions, that relate to this document:

UL: 07-02-08-01



631- Product - manual

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UL: 07-01-05-06



635- Product - manual

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UL: 07-02-08-03



637- Product - manual

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UL: 07-02-09-01



637+- Product - manual

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UL: 07-05-03-02



SERVOdrive CAN – Interface - Product - description

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UL: 10-06-03



Serielles Übertragungsprotokoll EASY-seriell - Product - description

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UL: 10-06-05



BIAS – Command description

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Made in Germany, 2004

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## The most important thing first

Thanks for your confidence choosing our product.

These operating instructions present themselves as an overview of the technical data and features.

Please read the operating instructions before operating the product.

If you have any questions, please contact your nearest SSD Drives representative. Improper application of the product in combination with dangerous voltage can lead to injuries.

In addition, damage can also occur to motors or other products.

Therefore please observe our safety precautions strictly.

### Safety precautions

We assume that, as an expert, you are familiar with the relevant safety regulations, especially in accordance with VDE 0100, VDE 0113, VDE 0160, EN 50178, the accident prevention regulations of the employers liability insurance company and the DIN regulations and that you are able to use and apply them.

As well, relevant European Directives must be observed.

Depending on the kind of application, additional regulations e.g. UL, DIN are subject to be observed.

If our products are operated in connection with components from other manufacturers, their operating instructions are also subject to be observed strictly.

# 1 General

For the SSD Drives Digital drive 630 series it is possible to read in the current counter status from an absolute encoder. The information read-in can then be processed further by the drive.

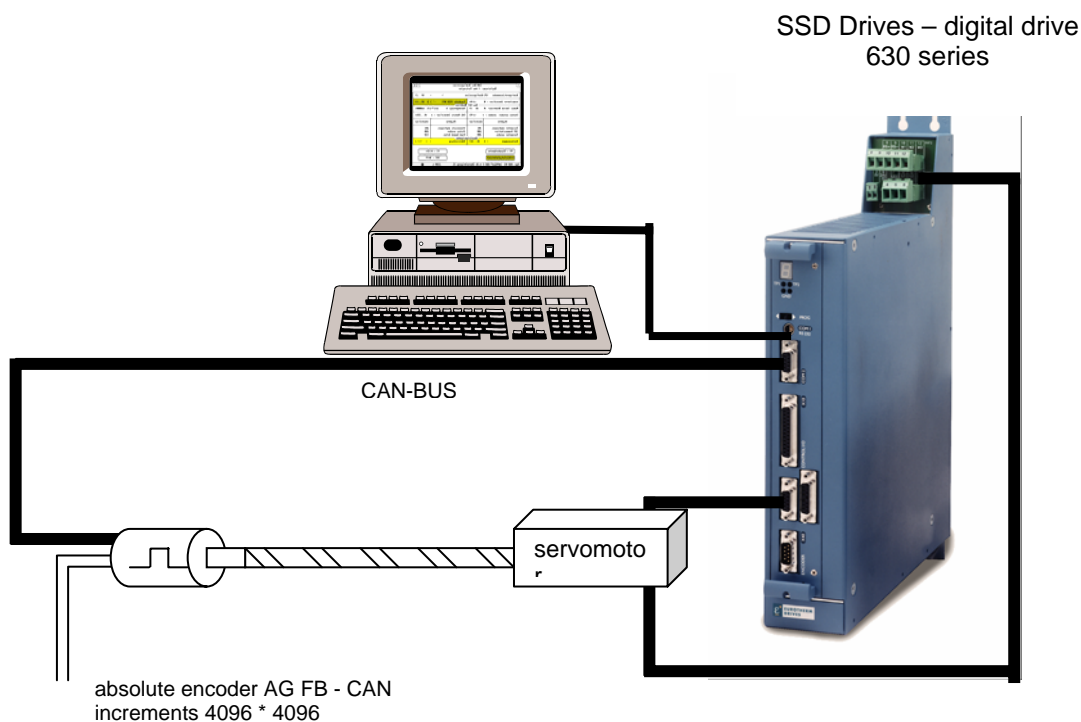
The CAN bus can be used as a transmission medium.

The function for the read-in of the absolute encoder is available on the regulators as of the firmware version V 6.15. The required configuration is supported as of the EASYRIDER for Windows version V 6.10

A multiturn encoder AG FB - CAN can be used as an absolute encoder. The encoder has a resolution of 4096 steps per revolution and 4096 revolutions. The value is binary-coded (24 bits).

The absolute encoder requires a supply voltage of +24 V DC.

## Schematic diagram



0V +24V DC

## 2 Type code

Marking	Standard						optional		
	a	b	c	d	e	f	g	h	i
Type:	AG	FB	12 * 12	XX	XX	/XX	-XX	X	XXX

Marking	Description
a	AG = Absolute encoder
b	FB = Key to the suppliers
c	Incremental resolution 12 = bit $\cong$ 4096 steps/rpm 12 = bit $\cong$ 4096 rpm
d	XX = Supply voltage 24 = 24 V DC (10 ... 30 V DC)
e	XX = electrical connections PR = PG-coupling radial $\cong$ standard
f	/XX = Shaft design /06 = $\varnothing = 6$ mm, l = 10 mm $\cong$ standard /10 = $\varnothing = 10$ mm, l = 20 mm
g	-00 = without cables -XX = Cable length
h	X = flange design (standard = SERVO) K = face mounting flange
i	XXX = Bus interface e.g. CAN $\cong$ standard

### 2.1 Typical example

A typical example of an order corresponding to the type code would be:

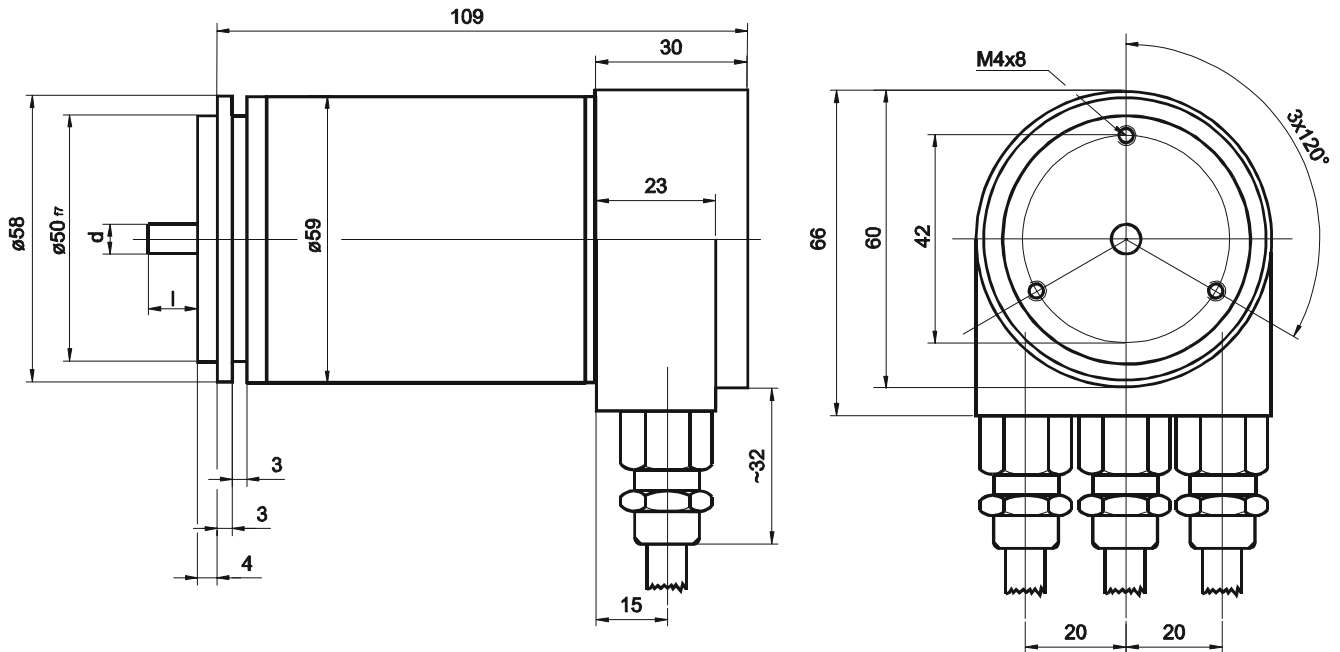
Type: AG FB 12\*12 24 PR 6 CAN  
 AG = Absolute encoder  
 FB = Key to the suppliers  
 12\*12 = Incremental resolution  
 24 = Supply voltage 24 V DC  
 PR = PG – coupling radial  
 /06 = Shaft design  
 CAN = Bus interface

### 3 Technical data

<b>Supply voltage:</b> min. voltage: max. voltage:	24V DC 10V DC 30V DC
<b>possible designs:</b> incretets/rpm number of rpm	up to 4096 up to 4096
<b>Power consumption:</b>	max. 3,5W
<b>Step frequency:</b>	max. 100 kHz
<b>Transmission rate, variable:</b>	20 Kbit/s – 1 Mbit/s
<b>maximum speed:</b>	6000 1/min
<b>Degree of protection:</b> (without shaft sealing ring)	IP 65
<b>Design:</b>	Multiturn
<b>Bus option:</b>	CAN bus with SSD Drives-protocol

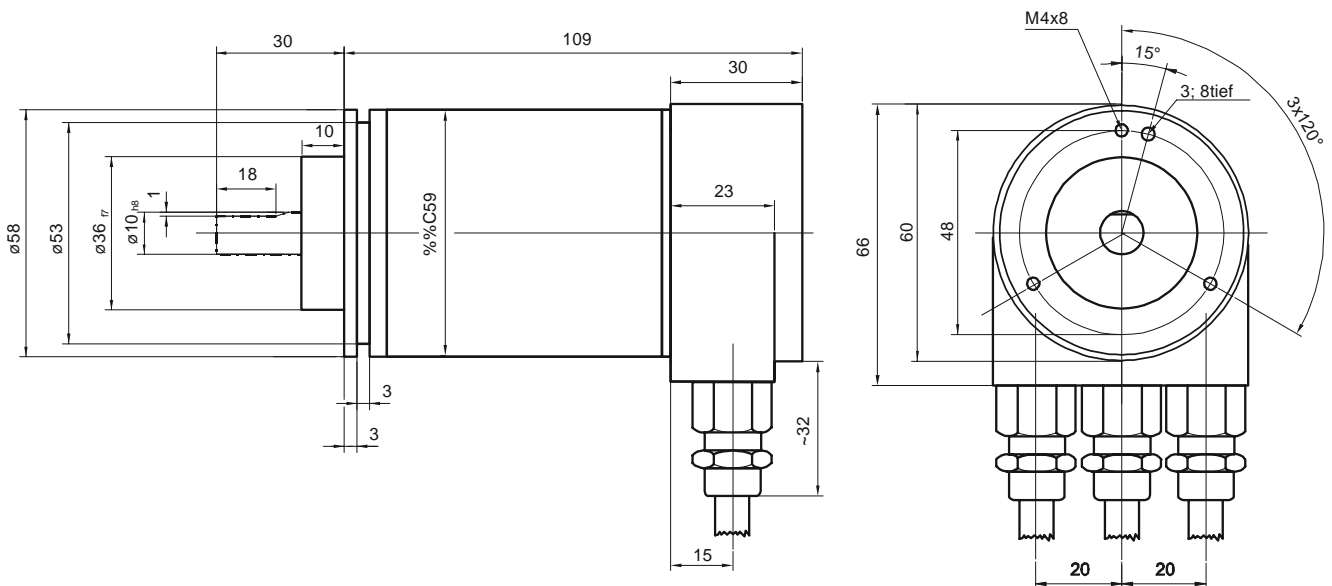
## 4 Dimensions

### 4.1 Synchro flange



d (mm)	l (mm)
6 <sub>f6</sub>	10
10 <sub>h8</sub>	20

### 4.2 Clamp flange

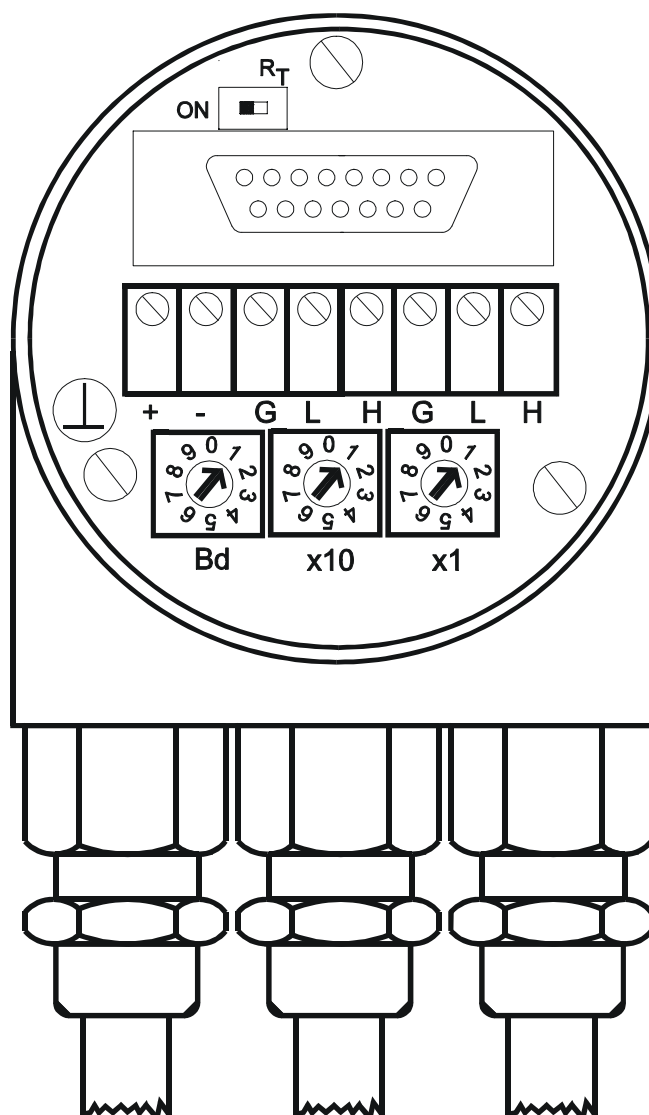


All specifications in "mm"



## 5 Connector assignment and functions

### 5.1 Terminal assignment of the connector cover of the absolute encoder



Terminal	Description	Designation
+	+ 24 V power supply	+
-	0 V power supply	-
G	Ground	GND
L	CAN_L bus line (dominant low)	CAN_L
H	CAN_H bus line (dominant high)	CAN_H
G	Ground	GND
L	CAN_L bus line (dominant low)	CAN_L
H	CAN_H bus line (dominant high)	CAN_H

## Connector assignment and functions

### 5.2 Turn-switch setting

In the terminal cover of the absolute encoder the following settings must be carried out at the initial start-up

#### Basic settings:

x10, x1: Setting the CAN node number

BD: Setting the baud rate

RT: Switch the terminal resistance for the last bus participant: (120  $\Omega$  resistance)

#### 5.2.1 Setting the node number

The setting of the node number is achieved by 2 turn – switches v(x10, x1) in the connection cap. Possible addresses lie between 0 and 31 whereby every address can only be used once. Inside the encoder the defined address is increased by one. 2 LEDs on the backside of the connection cap show the operating status of the encoder.

CANopen device BCD – Turn-switch	
x1	Device address 0...31 Setting the CAN – node number

#### 5.2.2 Setting the baud rate

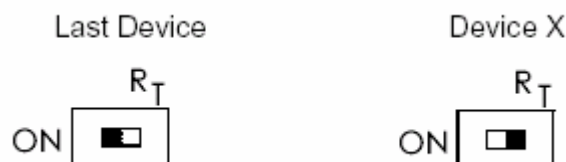
Following baud rate are possible:

Baud rate in kBits/s	BCD – Turn-switch
20	0
50	1
100	2
125	3
250	4
500	5
800	6
1000	7
reserved	8 ... 9

#### 5.2.3 Setting the bus terminal resistance

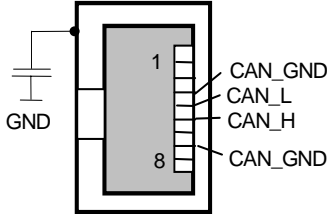
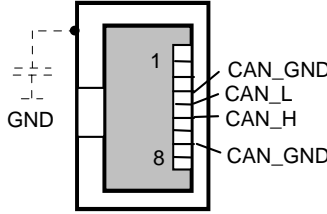
There is a resistor provided in the connection cap, which must be used as a line termination on the last device.

terminating resistor (120  $\Omega$ )



## Connector assignment and functions

### 5.3 Pin assignment for X20/21 CAN – 631 Regler

Pin	Function	X20	X21
	X20 and X21 are identically and internal switched in parallel with all pins. (X20 = X21) Therefore Bus-wiring is easy.	8-pole Modular Jack, screened 	8-pole Modular Jack, screened 
-	internal conn. to GND via capacitor	Case: Screened	Case: Screened
1			
2			
3	CAN_GND reference galvanically separated. Coupling-resistor to PE / GND: 1MΩ		
4	CAN_L (dominant low)		
5	CAN_H (dominant high)		
6			
7	(CAN_GND, like Pin 3)		
8			

This Pin-Assignment is related to „CiA Draft Recommendation DR-303, V0.1 / 16.10.98“.  
The wires on Pins 3/6 and 4/5 should be twisted pairs

### 5.4 Pin assignment Com2 – 635/637/637+ drive

(SUB D09 socket)  
Pin assignment for **CAN**  
with configuration board RP-CAN  
with galvanic separation

Pin	Description	Designation
1	-	-
2	CAN_L bus line (dominant low)	CAN_L
3	Ground	GND
4	-	-
5	-	-
6	Ground	GND
7	CAN_H bus line (dominant high)	CAN_H
8	-	-
9	-	-

If the regulator is the last participant on the bus, a terminal resistor with 124 Ω must be switched between the lines CAN\_L and CAN\_H (pins 2 and 7).

## 6 EASYRIDER configuration

### 6.1 General setting

Corresponding to the settings in the terminal cover of the absolute encoder, the node number and the baud rate in the regulator must be set for communication with the help of the EASYRIDER software

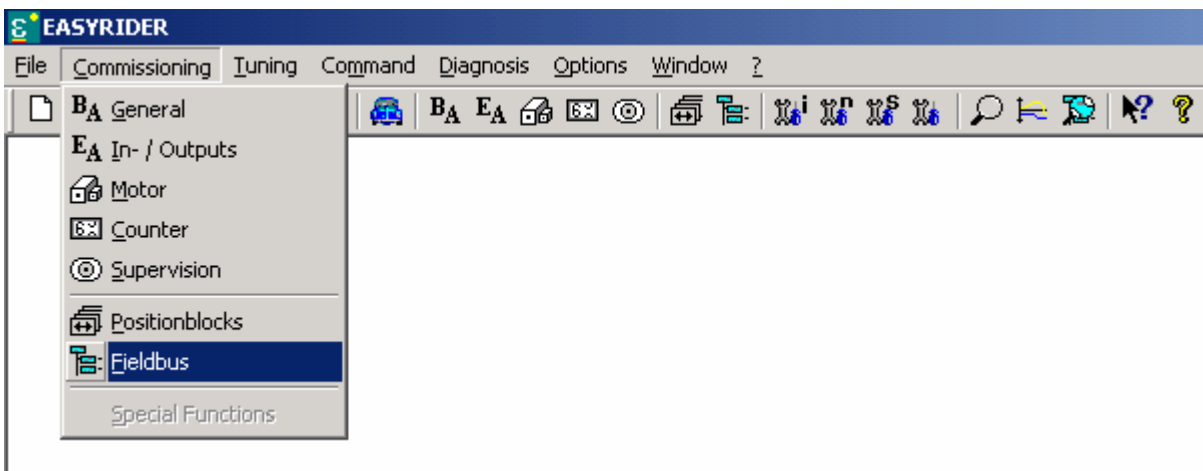
**Important:**

When the node number 0 is entered, the absolute encoder is deactivated!!!

Initializing the CAN bus connection with absolute encoder on the 630 drives can be done with the EASYRIDER software for windows.

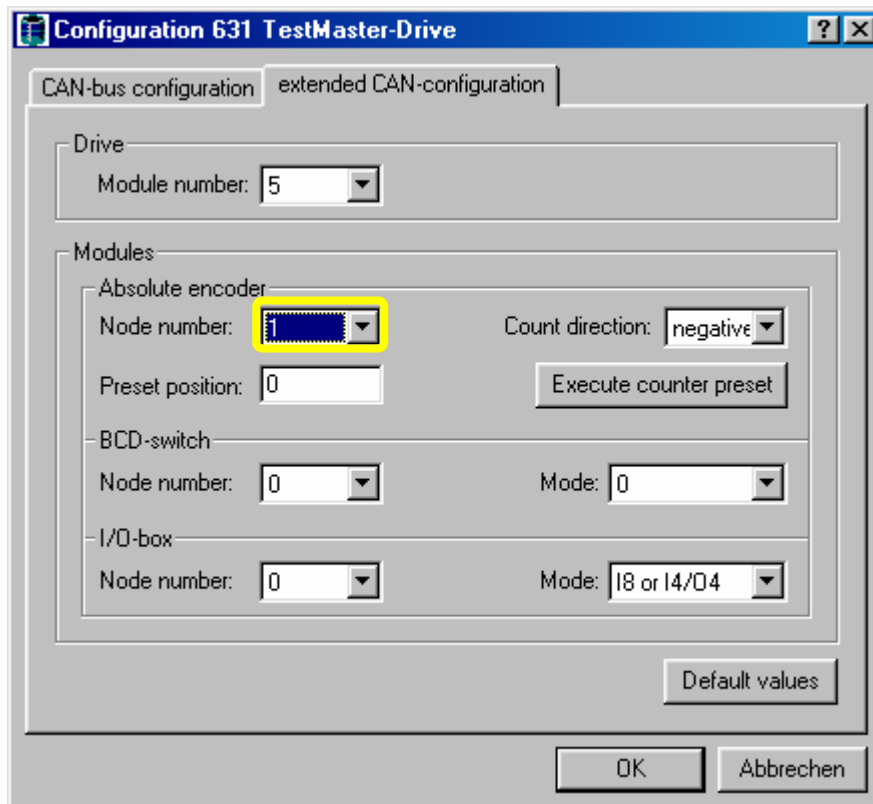
In the menu Commissioning → Feldbus

the following parameters are to be carried out for the initial start-up:



**Example:**

Node number 1 and turn switch setting is 0



## EASYRIDER configuration

### General setting

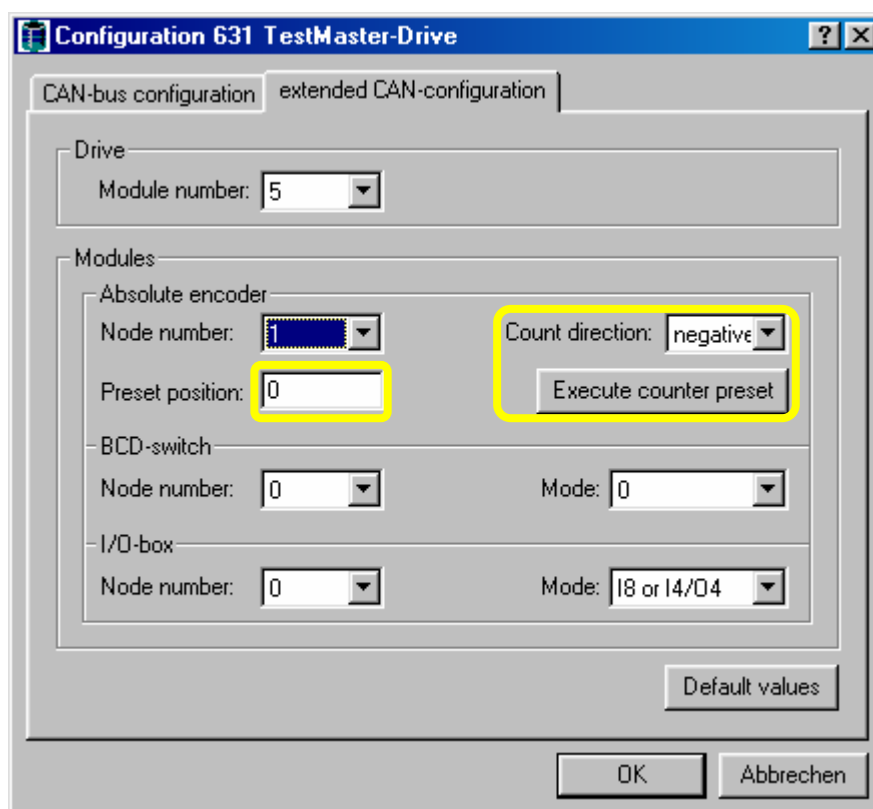
In addition, the absolute value and the direction of counting of the encoder can be initialised in this menu.

#### Important procedures at initial start-up

1. Determine the direction of counting and set it in the configuration menu.
2. Re-initialize the absolute value counter state (Preset position)
3. Activate with keystroke "Execute counter preset"

#### Important :

**The current absolute value is lost when the direction of counting is changed again !!!**



## EASYRIDER Configuration

### 6.2 Initialisierung des Datenaustausches

If the node number and baud rate are set correctly, the process data interchange with the absolute encoder must be activated at every Power on.. (operational state)

Therefore it is necessary, to transmit a NMT (Network Management Telegram) on the encoder.

Provided there is no Network master connected to the CAN-bus , this telegram can be transmitted from the controller side with the BIAS command „CAN Command“.

The command has to be programmed for node number 1 as follows:

```
0 [Variable 0 ]= 0 ; Identifier 0 ( NMT)
1 [Variable 1 ]= 257 ; ( Knr.*256 +1)
2 [Variable 2 ]= 0
3 [Variable 3 ]= 0
4 [Variable 4 ]= 0
5 CAN-Command ; start = [variable 0 ]
```

For that send the telegram's the absolute value is read in cyclically (every 2 ms) in the regulator and stored at the internal location actual position 3.

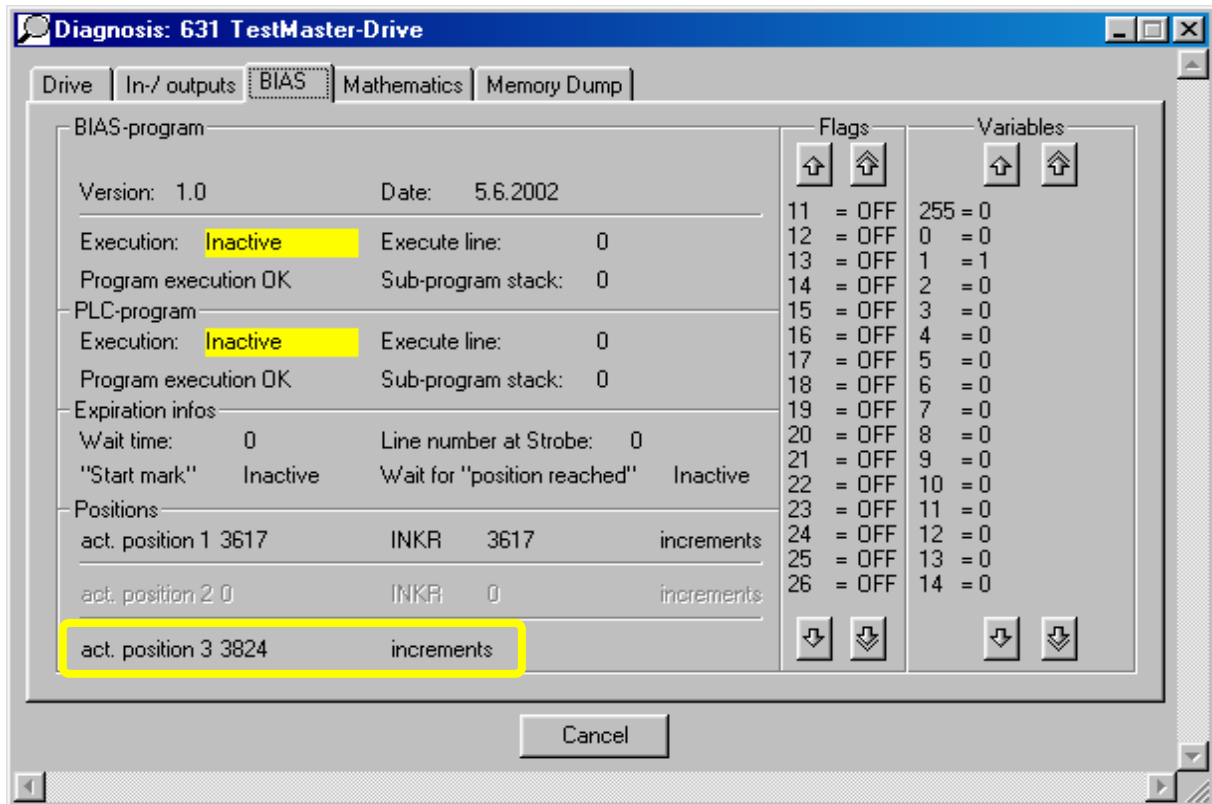
The further processing of this value must then be programmed in the regulator according to the application.

IF a master control is existing on the CAN-bus, NMT – telegram also be transmitted from the master control to the absolute encoder.

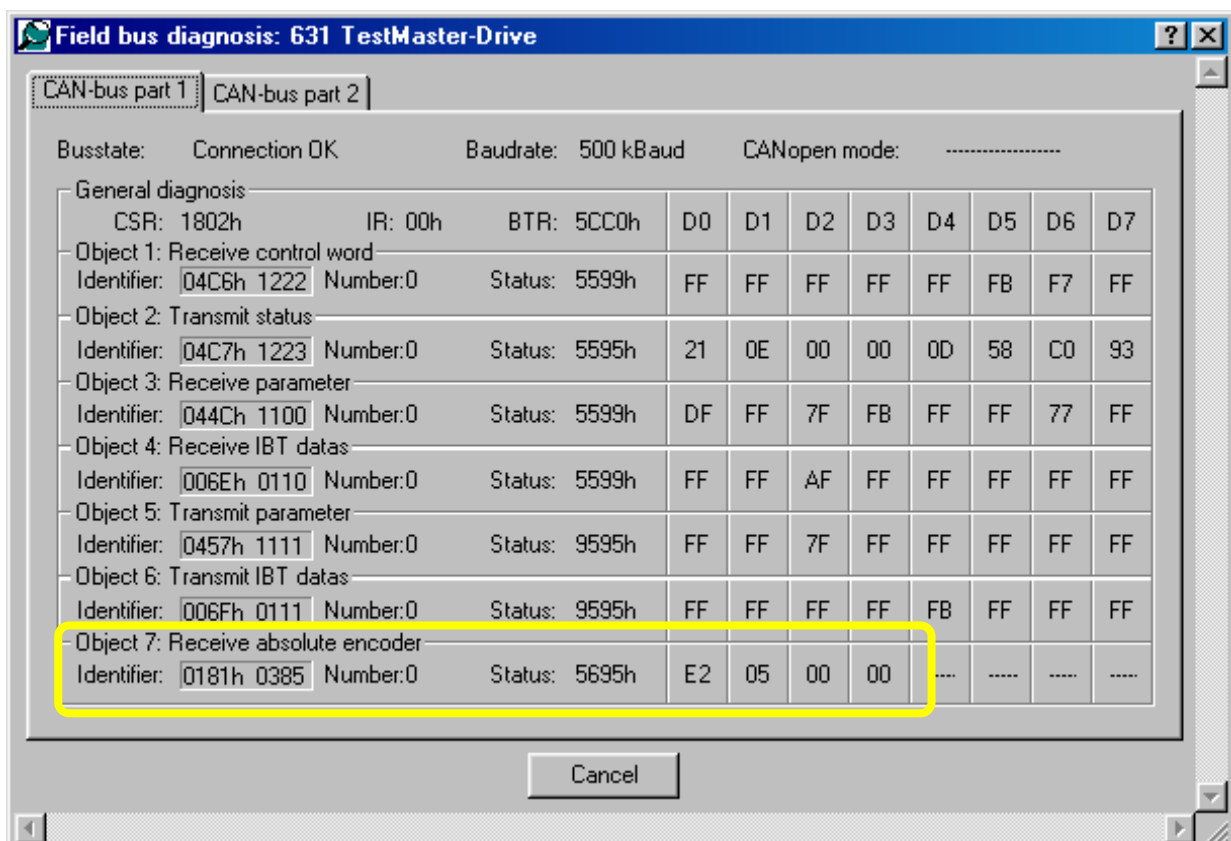
## EASYRIDER Configuration

### 6.3 EASYRIDER Diagnosis

In the EASYRIDER diagnosis page "BIAS diagnosis" the current actual value is displayed as actual position 3.



Further, the actual status of Object 7: „Receive absolute encoder“ can be diagnosed in EASYRIDER Feldbus diagnosis



## EASYSRIDER Configuration

### 6.4 Identifier assignment

If several stations are networked in the CAN bus, it is absolutely necessary to coordinate and identifier assignment.

Limited by the node numbers and function codes of the absolute encoder, the following identifiers are reserved depending on the node numbers.

Read Message object 7 (PDO process data object) for absolute value

**ID 181h / 385d (node number 1)**

~.....

**ID 1A0h / 416d (node number 32)**

Write Message Object 9 (SDO service data object) for configuration values

**ID 601h / 1537d (node number 1)**

~.....

**ID 620h / 1568d (node number 32)**

#### **Attention!!**

An address (identifier) may only occur once in the CAN bus configuration.



## 7 Use for the absolute value position

### 7.1 BIAS - commands

In operating mode 5 using the BIAS command language, now this actual value can be processed with the commands

"If actual position 3 ? const. then Jump" (29h)

"If actual position 3 ? [Var. Y] then Jump" (2Ah)

"[Var. X] = actual position 3" (46h)

### 7.2 BIAS - program

```
*****
*
* 6. BIAS application example for reading in the absolute encoder
*****
*
* Necessary CAN-BUS configuration (configuration menu, field bus module)
* CAN baud rate 1 = 500 kBAud, node number 2
*****
*
* Function: The absolute value is activated, read in when the regulator is initially
* switched on and is loaded as control actual value in the
* actual position 1 (preset) when the regulator is activated
*****
*
* Variables and flags used
* Variable 10 = absolute value (actual value 3) of the absolute encoder
* Flag 0 = Identifier actual value 3 read once
*
PROG_START:
* NMT Telegram „ Start node 2 „ activate → take node 2 in operational mode
0 [Variable 0 ] = 0 ; Identifier 0 ( NMT)
1 [Variable 1 ] = 513 ; ( Knr.*256 +1)
2 [Variable 2 ] = 0
3 [Variable 3 ] = 0
4 [Variable 4 ] = 0
5 CAN-command ; start=[variable 0 ]
6 Wait time 10 ms
* Read_encoder
7 [variable 10 ] = Actual position 3
8 Actual position 1 = [variable 10]
*****
* Start of position application
LOOP:
9 Jump LOOP *****
```

### 7.3 Operating panel IBT communication

For communication with the IBT the actual position 3 is provided cyclically on the data word 1002 for the operating panel.



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