

**Speed sensor module ENC-1**  
Static frequency inverters up to 250 kW



**S5**

Installation /  
Machine designation: .....  
Frequency inverter Type: .....  
Serial-No.: .....

**Supplement S5 to the operating instructions  
for frequency inverter VCB 400  
with speed sensor module ENC-1**

<b>VCB 400-010</b>	<b>—</b>	<b>4 kW</b>
<b>VCB 400-014</b>	<b>—</b>	<b>5,5 kW</b>
<b>VCB 400-018</b>	<b>—</b>	<b>7,5 kW</b>
<b>VCB 400-025</b>	<b>—</b>	<b>11 kW</b>
<b>VCB 400-034</b>	<b>—</b>	<b>15 kW</b>
<b>VCB 400-045</b>	<b>—</b>	<b>22 kW</b>
<b>VCB 400-060</b>	<b>—</b>	<b>30 kW</b>
<b>VCB 400-075</b>	<b>—</b>	<b>37 kW</b>
<b>VCB 400-090</b>	<b>—</b>	<b>45 kW</b>
<b>VCB 400-115</b>	<b>—</b>	<b>55 kW</b>
<b>VCB 400-135</b>	<b>—</b>	<b>65 kW</b>
<b>VCB 400-150</b>	<b>—</b>	<b>75 kW</b>
<b>VCB 400-180</b>	<b>—</b>	<b>90 kW</b>
<b>VCB 400-210</b>	<b>—</b>	<b>110 kW</b>
<b>VCB 400-250</b>	<b>—</b>	<b>132 kW</b>
<b>VCB 400-300</b>	<b>—</b>	<b>160 kW</b>
<b>VCB 400-370</b>	<b>—</b>	<b>200 kW</b>
<b>VCB 400-460</b>	<b>—</b>	<b>250 kW</b>

Valid from frequency inverter software version V2.1  
Version of the supplement 1.0  
Item number of the supplement 051 105 098  
Version: September 1998

## A IMPORTANT INFORMATION ON THESE OPERATING INSTRUCTIONS

These operating instructions are valid for the frequency inverter range **VCB 400** with speed sensor module ENC-1.

A **list of contents** is provided for you at the beginning of these operating instructions.

The **Operating Instructions Part 1 General information and power section** contains general information, the construction and layout drawings, technical data, the dimensional drawings and the description of the cable connections.

The **Operating Instructions Part 2 Control section and parameterisation** describes certain configurations with the relevant control connections and gives information on the handling of the control unit **KP 100**, the individual equipment parameters and their parameterisation.

The **instructions for the speed sensor module ENC-1** supplement the documentation belonging to the frequency inverter with the details for the use of the expansion card. Please consult the operating instructions part 2 for information relevant to the application.

For more clarity the following pictograms are used in the operating instructions for warnings and notes.



⇒ Caution! Lethal risk from high direct contact voltage.



⇒ Caution! Instruction must be observed.



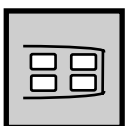
⇒ Caution! Disconnect the unit from the mains before performing any operation and wait at least 5 minutes until the intermediate circuits capacitors have discharged to a safe residual voltage.



⇒ Prohibited! Wrong handling may lead to damaging the equipment.



⇒ Useful note, tip.



⇒ Setting can be changed using the control unit KP100.



⇒ These parameters can be set in each of the four data sets.

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## A.1 FURTHER INFORMATION

These operating instructions have been drawn up with the greatest care and have been extensively checked several times. For reasons of clarity not all detailed information on all product models and also not every conceivable case of installation, operation or maintenance could be taken into account. Should you require further information or if particular problems should occur which are not treated in enough detail in the operating instructions you may request the necessary information from the local agent of the company VECTRON Elektronik.

We should like to indicate moreover that the contents of these operating instructions are not part of a previous or current agreement, confirmation of legal relationship nor should they amend this. All the manufacturer's obligations ensue from the relevant sales contract which also includes the complete and solely valid guarantee regulation. These contractual guarantee conditions are neither extended nor restricted by implementation of these operating instructions.

The manufacturer retains the right to correct or alter the contents and product details as well as omissions without previous notice and accepts no liability for damage, injuries or expenses resulting from the above named reasons.

## 1 GENERAL INFORMATION



### 1.1 SAFETY INSTRUCTIONS

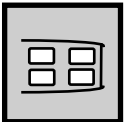
Please consult the relevant **operating instructions part 1 and part 2** for instructions to be observed on the safe handling and safe operation of the frequency inverter.

## 2 SPEED SENSOR MODULE ENC-1



The control hardware and the software of the frequency inverters of the construction range VCB can be virtually freely configured. This means that in theory it is possible to allocate certain functions to the control connections and the choice of the software modules used and their internal connecting is almost completely free.

This modular conception thus allows the adaptation of the frequency inverter to diverse drive tasks.



For known drive tasks the demands made on the control hardware and software are known. Consequently certain function allocations of the control connections as well as the internal connecting of the software modules could be laid down. These fixed allocations can be selected with the parameter *Configuration 30 (CONF)*.

Please consult the operating instructions (part 2, part 2A etc) relevant for the control system to be used for the possible assignments of the control connections within the selected fixed assignment and for the parameterisation for the configuration of the expansion card.

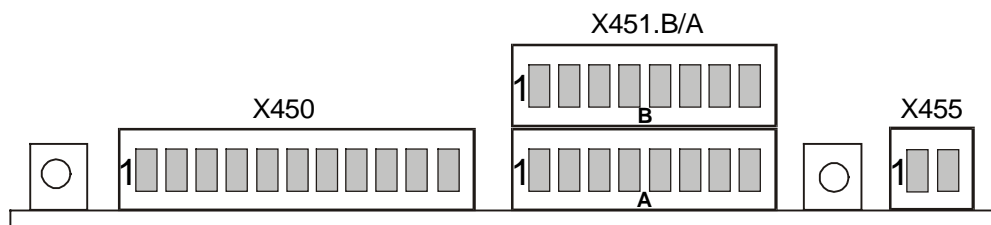
All the control connections of the frequency inverter are located underneath the covering hood which must be removed if necessary.

(Operating instructions part 1, construction and layout drawing)

The connections to the speed sensor module ENC-1 are led to the terminal strips X450, X451 and X455. These are two inputs for incremental speed sensors as well as a potential isolated repetition frequency output which is carried out as an incremental speed sensor simulation. There is additionally the connection of a motor temperature monitoring by a measuring resistor (PTC) or a bimetallic sensor.

The following chapters describe the expansion card with the help of a connection diagram and a detailed function or parameterisation description.

### Front view of speed sensor module ENC-1



**Note:** The **speed sensor module ENC-1** is **not** a part of the standard features of the frequency inverters and must be given separately in the order, depending on the application to be carried out.

## 2.1 SPECIFICATION OF THE CONTROL INPUTS AND OUTPUTS

The wiring of the control inputs and outputs of the frequency inverter is carried out at print terminals of the company Phoenix Contact. The connection consists of the mounted fixed socket and the plug labelled with the terminal designation.

Technical data		
Nominal voltage / current / diameter	V / A / mm <sup>2</sup>	125 / 8 / 1.5
Tightening torque	Nm	0.22-0.25
Screw thread	metric	M2
Connection capacity		
Rigid / flexible	mm <sup>2</sup>	0.14-1.5 / 0.14-1.5
Flexible with wire-end sleeve	mm <sup>2</sup>	0.25-1.5
Multiple wire connection (2 wires of the same diameter)		
Rigid / flexible	mm <sup>2</sup>	0.14-0.5 / 0.14-0.75
Flexible with wire-end sleeve	mm <sup>2</sup>	0.25-0.34



**Note:** MINI-COMBICON plug connectors may only be connected and isolated without power. Please consult the manufacturer's product information for detailed information.  
(Phoenix Contact print terminals MC1,5 G-3,81)

Motor PTC input, terminal strip X455	
X455-1 X455-2	Nominal response resistance > 2.85 kOhm (PTC) according to DIN 44081, thermistor or bimetallic temperature sensor (break contact) according to VDE 160 base isolated, fail safe logic

Digital inputs, terminal strip X451.A	
X451.A-1	Repetition frequency input DG2A , track A, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X451.A-2	Repetition frequency input DG2A_ , track A inverted, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X451.A-3	Repetition frequency input DG2B , track B, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X451.A-4	Repetition frequency input DG2B_ , track B inverted, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X451.A-5	Repetition frequency input DG2R , reference signal, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X451.A-6	Repetition frequency input DG2R_ , reference signal inverted, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X451.A-7	Masse/GND 5 V
X451.A-8	Supply voltage output + 5 V, max. current from terminal strip X451.A-8 and X450-8 = 250 mA

**Repetition frequency output, terminal strip X451.B**

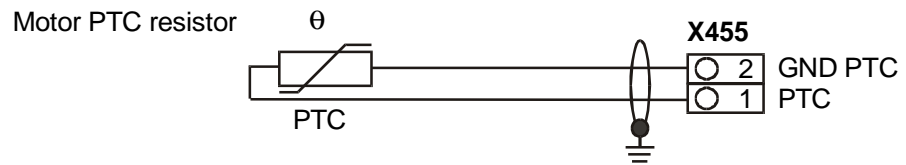
X451.B-1	Repetition frequency output FFOUTA, floating push-pull signal, difference level, overload-proof and short-circuit-proof, specification RS-422A / RS-485, max. output frequency 300 kHz
X451.B-2	Repetition frequency output FFOUTA_ , floating push-pull signal, difference level, overload-proof and short-circuit-proof, specification RS-422A / RS-485, max. output frequency 300 kHz
X451.B-3	Repetition frequency output FFOUTB, floating push-pull signal, difference level, overload-proof and short-circuit-proof, specification RS-422A / RS-485, max. output frequency 300 kHz
X451.B-4	Repetition frequency output FFOUTB_ , floating push-pull signal, difference level, overload-proof and short-circuit-proof, specification RS-422A / RS-485, max. output frequency 300 kHz
X451.B-5	Repetition frequency output FFOUTR , reference signal, floating push-pull signal, difference level, overload-proof and short-circuit-proof, specification RS-422A / RS-485, max. output frequency 300 kHz
X451.B-6	Repetition frequency output FFOUTR , reference signal inverted, floating push-pull signal, difference level, overload-proof and short-circuit-proof, specification RS-422A / RS-485, max. output frequency 300 kHz
X451.B-7	Ground/GND from ext. supply voltage for repetition frequency output FFOUT
X451.B-8	Supply voltage input for repetition frequency output FFOUT, max. voltage + 5 V +/- 5%, max. current 50 mA

**Digital inputs, terminal strip X450**

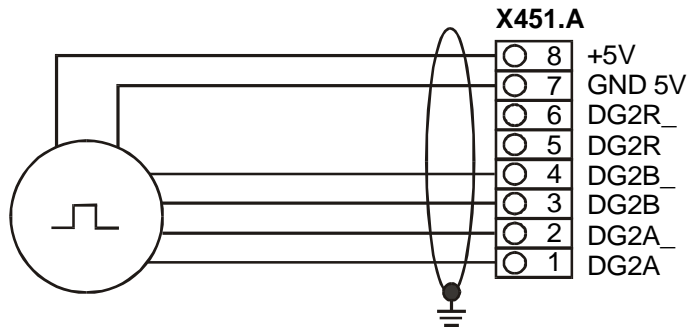
X450-1	Speed sensor inputs DG1A , track A, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X450-2	Speed sensor inputs DG1A_ , track A inverted, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X450-3	Speed sensor inputs DG1B , track B, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X450-4	Speed sensor inputs DG1B_ , track B inverted, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X450-5	Speed sensor reference input DG1R, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X450-6	Speed sensor reference input DG1R_ , inverted, voltage range 3,5V ... 25V, max. input frequency 300 kHz
X450-7	Ground/GND
X450-8	Supply voltage output + 5 V, max. current 250 mA, terminal strip X451.A-8 and X450-8 = 250 mA
X450-9	Supply voltage output + 24 V, max. current 250 mA
X450-10	Supply voltage output + 15 V, max. current 200 mA
X450-11	Supply voltage output - 15 V, max. current 200 mA



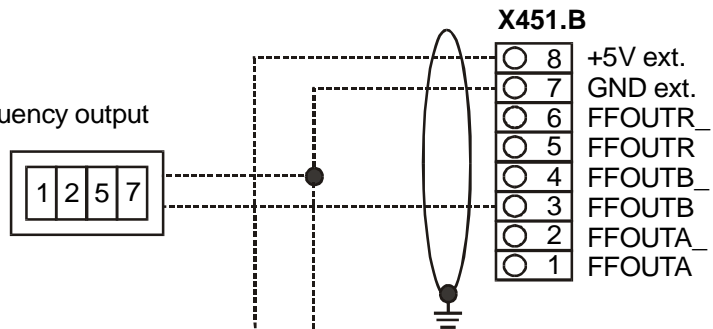
2.2 CONTROL TERMINAL CONNECTION PLAN



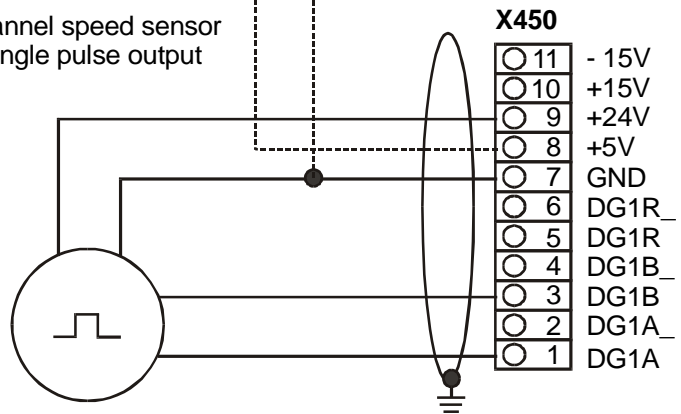
5V double channel speed sensor (slave) with push-pull output



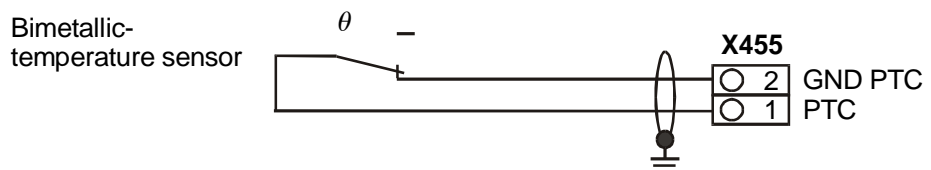
Repetition frequency output



24V double channel speed sensor (master) with single pulse output



2.2.1 ALTERNATIVE TERMINAL CONNECTION



### 2.3 EXPLANATION ON THE CONNECTION PLAN

**Motor PTC input, terminal strip X455**

Cl.	Class symbol	Function	Explanation/Use	Chapt.
1-2	-	-	Motor PTC input	3.1

**Digital inputs, terminal strip X451.A**

Cl.	Class symbol	Function	Explanation/Use	Chapt.
1	DG2A	-	incremental speed sensor 2 (slave), track A	3.2
2	DG2A_	-	incremental speed sensor 2 (slave), track A inverted	3.2
3	DG2B	-	incremental speed sensor 2 (slave), track B	3.2
4	DG2B_	-	incremental speed sensor 2 (slave), track B inverted	3.2
5	DG2R	-	incremental speed sensor 2 (slave), reference impulse	3.2
6	DG2R_	-	incremental speed sensor 2 (slave), reference impulse inverted	3.2
7	GND 5 V	-	Ground/GND 5 V	-
8	+ 5 V	-	supply voltage for 5 V incremental speed sensor and repetition frequency output	-

**Repetition frequency outputs, terminal strip X451.B**

Cl.	Class symbol	Function	Explanation/Use	Chapt.
1	FFAOUT	-	repetition frequency output, track A, push-pull signal	3.3
2	FFAOUT_	-	repetition frequency output, track A inv., push-pull signal	3.3
3	FFBOUT	-	repetition frequency output, track B, push-pull signal	3.3
4	FFBOUT_	-	repetition frequency output, track B inv., push-pull signal	3.3
5	FFROUT	-	repetition frequency output, reference signal, push-pull signal	3.3
6	FFROUT_	-	repetition frequency output, reference signal inverted, push-pull signal	3.3
7	GND ext.	-	Ground/GND 5 V ext.	-
8	+ 5 V ext.	-	Supply voltage input for repetition frequency output FFOUT	-

Digital inputs, terminal strip X450				
Cl.	Class symbol	Function	Explanation/Use	Chapt.
1	DG1A	-	incremental speed sensor 1 (master), track A	3.2
2	DG1A_	-	incremental speed sensor 1 (master), track A inverted	3.2
3	DG1B	-	incremental speed sensor 1 (master), track B	3.2
4	DG1B_	-	incremental speed sensor 1 (master), track B inverted	3.2
5	DG1R	-	incremental speed sensor 1 (master), reference impulse	3.2
6	DG1R_	-	incremental speed sensor 1 (master), reference impulse inverted	3.2
7	GND	-	Ground/GND	-
8	+ 5 V	-	supply voltage for 5 V incremental speed sensor and repetition frequency output	-
9	+ 24 V	-	supply voltage for 24 V incremental speed sensor	-
10	+ 15 V	-	supply voltage for + 15 V incremental speed sensor (bipolar)	-
11	- 15 V	-	supply voltage for - 15 V incremental speed sensor (bipolar)	-



**Note:** The connection to the incremental speed sensor input requires observance of the polarity and the correct assignment of the tracks of the speed sensor.  
The direction of rotation of the motor must be compared to the speed actual value signal when evaluating.

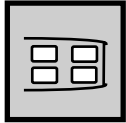
### 3 DESCRIPTION OF FUNCTIONS AND PARAMETERS

The speed sensor module EAL-1 has two inputs for incremental speed sensors as well as a potential isolated repetition frequency output, which is carried out as a speed sensor simulation. There is additionally an input for a potential isolated (base isolated) motor temperature monitoring with PTC or bimetallic sensor.

Please consult part 2 of the operating instructions for the frequency inverter for the use of the expansion card within the application.

#### 3.1 MOTOR PTC RESISTOR

The temperature of the connected load of the frequency inverter can be monitored by the connection of a measuring resistor (motor thermistor/PTC) with a temperature characteristic according to DIN 44081 or with a bimetallic temperature sensor (break contact).



The function selected according to the following table with parameter *Operation mode motor PTC 570 (MTSEL)* can be assigned to the digital control outputs S1OUT, S2OUT and relay output S3OUT, freely configurable.

The monitoring function for the relevant output can be set with parameter *Operation mode digital output 1 530 (D1SEL)*, parameter *Operation mode digital output 2 531 (D2SEL)* and parameter *Operation mode relay 2 532 (D3SEL)*.

(For further details see operating instructions part 2.)

Setting		
Operation mode 570 (MTSEL)	Function	Operation level
0	Warning	2
1 (Factory setting)	Disconnection on faults	2
2	Disconnection on faults after 1 min.	2
3	Disconnection on faults after 5 min.	2
4	Disconnection on faults after 15 min.	2
5	Disconnection on faults after 30 min.	2



The evaluation of the motor PTC connection is not dependent on the signal at the digital control input S1IND (FUF).

The function to be set with parameter *Operation mode motor PTC 570 (MTSEL)* leads to a signalling of the overtemperature by the light-emitting diodes LED H1 (green) and LED H2 (red) independent of the setting of the digital outputs.

Please consult part 1 and 2 of the operating instructions for the inverter for the evaluation of the state and position of the light-emitting diodes.



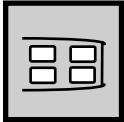
**Note:** In the case of an overtemperature of the motor the operation mode fault switch-off triggers the display of the fault message on the control unit KP100 in the form of a moving script with the text "F0400 MOTOR TEMPERATURE". The fault message is to be acknowledged with a reset via the control unit (parameter 34) or the contact input (S8IND) of the frequency inverter.

### 3.2 SPEED SENSOR INPUT, REPETITION FREQUENCY INPUT

The connection of a double channel speed sensor with push-pull output or single pulse output with and without reference impulse with a signal voltage of 0V to +24V (unipolar) and +/-15V (bipolar) is possible. The necessary voltage supply is provided at the connecting terminals of the frequency inverter.

The control input DG2 is equivalent to the control input DG1, is used however in the control system as a slave speed sensor input.

#### 3.2.1 EVALUATION



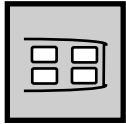
The evaluation of the input signal to be set with parameter *Operation mode speed sensor 1 490 (EC1SL)* and parameter *Operation mode speed sensor 2 493 (EC2SL)* can be seen in the following table.

Setting		
Oper. mode 490 (EC1SL) 493 (EC2SL)	Function	Oper. level
0 (factory setting of EC2SL)	Off, (there is no speed sensor evaluation)	1
1 (factory setting of EC1SL)	Simple evaluation with direction of rotation identification	1
2	Double evaluation with direction of rotation identification	1
4	Four-fold evaluation with direction of rotation identification	1
11	Simple evaluation without direction of rotation identification (Direction of rotation amount)	1
12	Double evaluation without direction of rotation identification (Direction of rotation amount)	1
14	Four-fold evaluation without direction of rotation identification (Direction of rotation amount)	1



**Note:** The operation modes 1, 2, 4 and 14 require the use of an incremental speed sensor with two tracks.

### 3.2.2 DIVISION MARK



The indication of the division mark of the incremental speed sensor or reference frequency speed sensor can be set with parameter *Division mark speed sensor 1* **491 (EC1N)** and parameter *Division mark speed sensor 2* **494 (EC2N)**. The permitted division mark is in the range of 1 to 8192.

The upper limit of the speed recording is given by the limit frequency of the inputs with  $f_{max}=300$  kHz. From this the maximum division mark  $S_{max}$  of the incremental speed sensor for a required maximum speed  $n_{max}$  can be calculated:

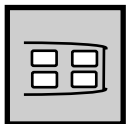
$$S_{max} = 300000Hz \cdot \frac{60s/min}{n_{max}} \quad n_{max} = \text{max. speed of the motor in } \text{min}^{-1}$$

To ensure a good true running of the drive a speed sensor signal must be evaluated at least every 2 ms (signal frequency  $f = 500$  Hz). From this requirement the minimum division mark  $S_{min}$  of the incremental speed sensor for a desired minimum speed  $n_{min}$  can be calculated:

$$S_{min} = 500Hz \cdot \frac{60s/min}{A \cdot n_{min}} \quad \begin{aligned} n_{min} &= \text{min. speed of the motor in } \text{min}^{-1} \\ A &= \text{evaluation (1, 2, 4)} \end{aligned}$$

Setting						
Parameter			Setting range		Factory setting	Oper. level
No	Abbr.	Meaning	Min	Max		
491	EC1N	Division mark speed sensor	1	8192	1024	1
494	EC2N				1024	

### 3.2.3 LEVEL



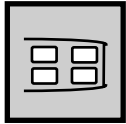
The signal level of the connected incremental speed sensor or repetition frequency speed sensor to be set with parameter *Speed sensor level 1* **492 (EC1L)** and parameter *Speed sensor level 2* **495 (EC2L)** can be seen in the following table.

Setting		
Operation mode	Function	Operation level
<b>492 (EC1L)</b>		
0 (Factory setting)	push-pull signal (5V...24V)	1
1	bipolar signal (+/-5V...+/-15V)	1
2	unipolar signal (0V/12V...0V/24V)	1



**Note:** The manufacturer's instructions on the incremental speed sensors must be observed. Other speed sensor models are to be connected according to the relevant operating instructions.

### 3.3 REPETITION FREQUENCY OUTPUT



The repetition frequency output FFOUT corresponds to the selected input value at the relevant digital control input and is used in an application similar to the electronic gear. The assignment is carried out by parameter *Repetition frequency output* **496 (FOSEL)** according to the following table.

Setting		
Operation mode 496 (FOSEL)	Function	Operation level
0	Off	2
1	Signals led through by speed sensor 1	2
2	Signals led through by speed sensor 2	2
3	Repetition frequency without ramp (Assignment according to the configuration, see table setting speed sensor simulation)	2
4	Repetition frequency with ramp (Assignment according to the configuration, see table setting speed sensor simulation)	2

With the operation mode repetition frequency the selection of a configuration, according to the application and to be set with parameter *Configuration* **30 (CONF)**, results in a fixed assigned output signal. (See also operating instructions part 2.)

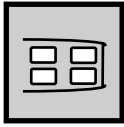
Operation mode repetition frequency		
Operation mode 30 (CONF)	Factory setting 496 (FOSEL)	Function
1xx	3	Signal corresponds to the stator frequency FS
2xx	1	Signal from speed sensor 1
3xx	1	Signal from speed sensor 1

If the operation mode speed sensor simulation is selected with parameter *Repetition frequency output* **496 (FOSEL)** then the parameterisation of the digital output is possible in operation level 2 via the parameter *Division mark repetition frequency output* **497 (FON)** and parameter *Ramp gradient repetition frequency output* **498 (FORMP)**.

Setting						
Parameter			Setting range		Factory setting	Oper. level
No.	Abbr.	Meaning	Min	Max		
497	FON	Division mark	1	8192	1024	2
498	FORMP	Ramp gradient	0,01 Hz/s	9999,99 Hz/s	1,00 Hz/s	2

**3.4 ANALOGUE OUTPUT S1OUTAI**

**3.4.1 SELECTION OF THE OUTPUT DIMENSION**



The analogue outputs S1OUTAI supply an output signal which is proportional to an actual value. With parameter *Operation mode analogue output 1* **550 (O1SEL)** the required actual value is set. The evaluation can be carried out by the connected peripheral in the form of a current signal (0 ... +/- 20 mA).



**Note:** The setting possibilities which extend the range of functions of the analogue output S1OUTAI in the standard configuration are listed below. The settings given in the operation instructions part 2 are to be used correspondingly.

Frequency without sign		
Operation mode analogue outputs 550 (O1SEL)	Output value	Range
3	incremental speed sensor input 1	0mA $\triangleq$ 0 min <sup>-1</sup> 20mA $\triangleq$ maximum speed
4	incremental speed sensor input 2	0mA $\triangleq$ 0 min <sup>-1</sup> 20mA $\triangleq$ maximum speed

Frequency with sign		
Operation mode analogue outputs 550 (O1SEL)	Output value	Range
103	incremental speed sensor input 1	-20mA $\triangleq$ n <sub>max</sub> (anticlockw.) 0mA $\triangleq$ 0 min <sup>-1</sup> +20mA $\triangleq$ n <sub>max</sub> (clockw. rot.)
104	incremental speed sensor input 2	-20mA $\triangleq$ n <sub>max</sub> (anticlockw.) 0mA $\triangleq$ 0 min <sup>-1</sup> +20mA $\triangleq$ n <sub>max</sub> (clockw. rot.)

Frequency without sign		
Operation mode analogue outputs 550 (O1SEL)	Output value	Range
203	incremental speed sensor input 1	4mA $\triangleq$ 0 min <sup>-1</sup> 20mA $\triangleq$ maximum speed
204	incremental speed sensor input 2	4mA $\triangleq$ 0 min <sup>-1</sup> 20mA $\triangleq$ maximum speed



## 4 COMMISSIONING PARAMETERS OF SPEED SENSOR MODULE ENC-1

### 4.1 DISPLAY PARAMETERS

Menü VAL (Istwerte)						
No.	Abbr.	Oper. level	Name/Meaning	Dim.	Setting range	Chapt.
217	EC1	1	Frequency speed sensor 1	Hz	0,00 ... 999,99	3.2.2
218	N1	1	Revolution speed sensor 1	1/min	0 ... 60000	3.2.2
219	EC2	1	Frequency speed sensor 2	Hz	0,00 ... 999,99	3.2.2
220	N2	1	Revolution speed sensor 2	1/min	0 ... 60000	3.2.2



**Note:** The display parameters are in part not visible depending on the selected configuration.

### 4.2 PARAMETER LIST

Parameters								
No.	Abbr.	Oper. level	Name/Meaning	Dim.	Setting range	Chapt.	Fact. setting	Cust. setting
490	EC1SL	1	Operation mode speed sensor 1	-	0/1,2,4/11,12,14	3.2.1	1	
491	EC1N	1	Division mark speed sensor 1	-	1 ... 8192	3.2.2	1024	
492	EC1L	1	Speed sensor level 1	-	0,1,2	3.2.3	0	
493	EC2SL	1	Operation mode speed sensor 2	-	0/1,2,4/11,12,14	3.2.1	0	
494	EC2N	1	Division mark speed sensor 2	-	1 ... 8192	3.2.2	1024	
495	EC2L	1	Speed sensor level 2	-	0,1,2	3.2.3	0	
496	FOSEL	2	Repetition frequency output	-	0,1,2,3	3.3	0	
497	FON	2	Division mark repetition frequency output	-	1 ... 8192	3.3	1024	
498	FORMP	2	Ramp gradient repetition frequency output	Hz/s	0,01 ... 9999,99	3.3	1,00	
570	MTSEL	2	Operation mode motor PTC	-	0,1,2,3,4,5	3.1	1	