Parameter Description

R67021.0002 – Index 7c

For the SMC2.2 / SMC1.1 safety units

- Supplement to the SMC operating manual
- Describes the SMC parameter functions
- incl. Parameter list as short overview
- For setup and commissioning procedure
- Overview of all registers

Publisher	Kübler Group, Fritz Kübler GmbH Schubertstraße 47 D-78054 Villingen-Schwenningen Germany www.kuebler.com
Technical support	Phone +49 7720 3903-0 Fax +49 7720 21564 servicecenter@kuebler.com
Document-No.	R67021.0002 – Index 7c
Document-Name	Safety-M compact SMC2.2 / SMC1.1, Parameter description
Language Version	English (EN) – German is original version
Release Date	21.07.2021

Version:	Description:
R67021 04b pd /Jan-16/ag	First separated version as parameter description
R67021 05a pd /af	Page 27 line 19… / OUT5 replaced with …/OUT4 Capter 2.2: Parameter 090, Default = 0,000 - 1,000 (instead of 0000 – 1000) New parameter, major modifications
R67021 06a pd /af	New Parameter A-Edge 2/1 Frequency range from 0.1Hz to 0.01Hz was enlarged
R67021 07a pd /cf	New parameters, major adjustments
R67021 07b pd /cf	Minor adjustments
R67021 07c pd /mbo/kae	Revised version

General

This parameter description was created as a separate document for an optimum overview. It contains information about the entire SMC2.2 / SMC1.1 registers as well as a parameter list at the end of the document.

Table of Contents

1. Parameter / Menu Overview

The parameterization of the device is realized via USB interface with a PC and the operating software OSxx. The software can be downloaded free from our homepage (www.kuebler.com/software).
This section provides an overview of the menus and their assignments to the different unit functions. The menu names are printed bold and associated Parameters are arrayed directly under the menu names.

No.	Menu / Parameter
	Main Menu
000	Operational Mode
001	Sampling Time
002	Wait Time
003	F1-F2 Selection
004	Div. Switch %-f
005	Div. %-Value
006	Div. f-Value
007	Div. Calculation
008	Div. Filter
009	Error Simulation
010	Power-up Delay
011	SIN Error
012	Div. Mode
013	Div. Inc-Value
014	Filter
015	A-Edge 2/1
016	Sensor Overlap
	Sensor1 Menu
017	Direction1
018	Multiplier1
019	Divisor1
020	Position Drift1
021	Phase Err Count1
022	Set Frequency1
023	SIN Err Time1
	Sensor2 Menu
024	Direction2
025	Multiplier2
026	Divisor2
027	Position Drift2
028	Phase Err Count2
029	Set Frequency2
030	SIN Err Time2
Nr.	**Menu / Parameter**

Nr.	Menu / Parameter
	Preselect Menu
031	Preselect OUT1.H
032	Preselect OUT1.L
033	Preselect OUT1.D
034	Preselect OUT2.H
035	Preselect OUT2.L
036	Preselect OUT2.D
037	Preselect OUT3.H
038	Preselect OUT3.L
039	Preselect OUT3.D
040	Preselect REL4.H
041	Preselect REL4.L
042	Preselect REL4.D
043	Preselect REL1.H
044	Preselect REL1.L
045	Preselect REL1.D
046	Preselect OUT1.F
047	Preselect OUT2.F
048	Preselect OUT3.F
049	Preselect OUT4.F
050	Preselect REL1.F
051	*Reserved*

Nr.	Menu / Parameter

	Switching Menu
052	Switch Mode OUT1
053	Switch Mode OUT2
054	Switch Mode OUT3
055	Switch Mode OUT4
056	Switch Mode REL1
057	Pulse Time OUT1
058	Pulse Time OUT2
059	Pulse Time OUT3
060	Pulse Time OUT4
061	Pulse Time REL1
062	Hysteresis OUT1
063	Hysteresis OUT2
064	Hysteresis OUT3
065	Hysteresis OUT4
066	Hysteresis REL1
067	Matrix OUT1
068	Matrix OUT2
069	Matrix OUT3
070	Matrix OUT4
071	Matrix REL1
072	MIA-Delay OUT1
073	MIA-Delay OUT2
074	MIA-Delay OUT3
075	MIA-Delay OUT4
076	MIA-Delay REL1
077	MAI-Delay OUT1
078	MAI-Delay OUT2
079	MAI-Delay OUT3
080	MAI-Delay OUT4
081	MAI-Delay REL1
082	Delay OUT1
083	Delay OUT2
084	Delay OUT3
085	Delay OUT4
086	Delay REL1
087	Startup Mode
088	Startup Output
089	Standstill Time
090	Lock Output
091	Action Output
092	Action Polarity
093	Read Back OUT
094	Output Mode
095	*Reserved*
096	*Reserved*
097	*Reserved*
098	*Reserved*
099	*Reserved*
	Control Menu
100	IN1 Function
101	IN1 Config
102	/IN1 Function
103	/IN1 Config
104	IN2 Function
105	IN2 Config
106	/IN2 Function
107	/IN2 Config
108	Input Mode
109	Read Back Delay
110	GPI Err Time
	Serial Menu
111	Serial Unit Nr.
112	Serial Baud Rate
113	Serial Format
114	Serial Page
115	Serial Init
116	*Reserved*
	Splitter Menu
117	RS Selector
	Analog Menu
118	Analog Start
119	Analog End
120	Analog Gain
121	Analog Offset
122	*Reserved*
	OPU Menu
123	X Factor 1
124	/ Factor 1
125	+/- Value 1
126	Units 1
127	Decimal Point 1
128	X Factor 2
129	/ Factor 2
130	+/- Value 2
131	Units 2
132	Decimal Point 2
133	*Reserved*

2. Parameter Description

2.1 Important notes for SMC1.1

When using a SMC1.1 variant, the following hints must be observed:

Nr.	Parameter	Hints for SMC1.1
000	Operational Mode	Exclusively „Mode = 0“ may be used
003	F1-F2 Selection	Both settings have the same effect
017	Direction1	Direction1 and Direction2 must be equal
018	Multiplier1	The setting must be „1“
019	Divisor1	The setting must be „1“
020	Position Drift1	Position Drift1 and Position Drift2 must be equal
021	Phase Err Count1	Phase Err Count1 and Phase Err Count2 must be equal
023	Direction2	Direction1 and Direction2 must be equal
024	Multiplier2	The setting must be „1“
025	Divisor2	The setting must be „1“
026	Position Drift2	Position Drift1 and Position Drift2 must be equal
027	Phase Err Count2	Phase Err Count1 and Phase Err Count2 must be equal
028	*IN* Function	To clear drift errors, Clear Drift 1&2 must be used
030	RS Selector	Both settings have the same effect
100 - 107	*IN* Function	To erase drift errors, Drift 1 & 2 must be used
117	RS Selector	Both settings deliver the same result

2.2 Main Menu

No.	Parameter	Range	Default
000	**Operational Mode:** This parameter determines which frequency input is assigned to Sensor1 and Sensor2. Depending on the assignment, up to 4 control inputs for external commands are available. Notes and examples for wiring the encoders, control inputs etc. can be found in the operating manual of the SMC unit.	0 - 9	0

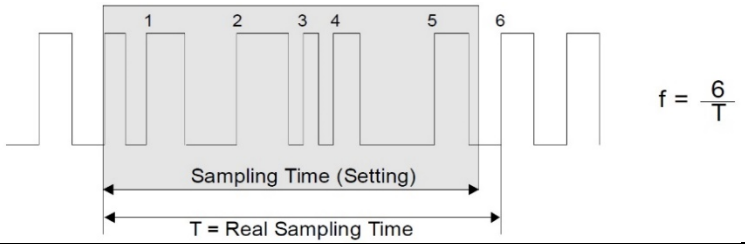
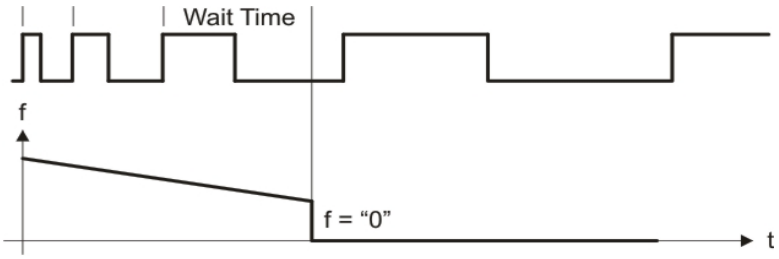
Operational Mode of SMC2.2:
To ensure the safety function, two independent sensors / encoders are required.

Mode	Sensor1	Sensor2	[X10: 2 and 3]	[X10: 4 and 5]
0	SinCos encoder to [X6 | SINCOS IN 1]	SinCos encoder to [X7 | SINCOS IN 2]	Available for control signals	Available for control signals
1	SinCos encoder to [X6 | SINCOS IN 1]	HTL encoder (A, B, 90°) to [X10 | CONTROL IN]	Available for control signals	**Not** available for control signals!
2	SinCos encoder to [X6 | SINCOS IN 1]	HTL encoder (A) to [X10 | CONTROL IN]	Available for control signals	**Not** available for control signals!
3	HTL encoder (A, B, 90°) to [X10 | CONTROL IN]	HTL encoder (A, B, 90°) to [X10 | CONTROL IN]	**Not** available for control signals!	**Not** available for control signals!
4	HTL encoder (A, B, 90°) to [X10 | CONTROL IN]	HTL encoder (A) to [X10 | CONTROL IN]	**Not** available for control signals!	**Not** available for control signals!
5	HTL encoder (A) to [X10 | CONTROL IN]	HTL encoder (A) to [X10 | CONTROL IN]	**Not** available for control signals!	**Not** available for control signals!
6	SinCos encoder to [X6 | SINCOS IN 1]	RS422 encoder to [X9 | RS422 IN 2]	Available for control signals	Available for control signals
7	RS422 encoder to [X8 | RS422 IN 1]	RS422 encoder to [X9 | RS422 IN 2]	Available for control signals	Available for control signals
8	RS422 encoder to [X8 | RS422 IN 1]	HTL encoder (A, B, 90°) to [X10 | CONTROL IN]	Available for control signals	**Not** available for control signals!
9	RS422 encoder to [X8 | RS422 IN 1]	HTL encoder (A) to [X10 | CONTROL IN]	Available for control signals	**Not** available for control signals!

Operational Mode of SMC1.1:
To ensure the safety function, a SIL3/PLe certified SinCos sensor resp. encoder is required.

Mode	Sensor1	Sensor2	[X10: 2 and 3]	[X10: 4 and 5]
0	SIL3/PLe SinCos encoder to [X6 | SINCOS IN 1]	Sensor1 and Sensor2 are internally bridged	available for control signals	available for control signals

Continuation **“Main Menu”:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>001</td><td><u>Sampling Time</u>:
The configured value corresponds to the minimum measurement time. The Parameter is used as a filter in case of irregular frequencies. This parameter directly affects the response time of the unit. The setting is valid for both inputs channels.
 
</td><td>0.001 - 9.999
(sec.)</td><td>0.001</td></tr>
<tr><td>002</td><td><u>Wait Time</u> <u>(Zeroing)</u>:
Defines the period time of the lowest frequency resp. the waiting time between 2 rising edges, which is detected as frequency = 0 Hz by the unit.
 

All frequencies with a period longer than the Wait Time value will be interpreted as frequency = 0 Hz.
<table><tr><td>0.010</td><td>Frequency = 0 Hz with frequencies smaller than 100 Hz</td></tr><tr><td>…</td><td></td></tr><tr><td>9.999</td><td>Frequency = 0 Hz with frequencies smaller than 0.1 Hz</td></tr></table>
The setting is valid for both inputs channels.</td><td>0.010 - 9.999
(sec.)</td><td>0.100</td></tr>
<tr><td>003</td><td><u>F1-F2 Selection</u> <u>(Basic Frequency Selection)</u>:

This Parameter determines, which of both input frequencies of Sensor1 or Sensor2 (parameter „Operational Mode“) will be monitored and processed as basic frequency.

The basic frequency selection affects the following outputs:

- Analog output
- Control outputs
- Relay outputs

<table><tr><td>0</td><td>Frequency of Sensor1 serves as basic frequency</td></tr><tr><td>1</td><td>Frequency of Sensor2 serves as basic frequency</td></tr></table></td><td>0 - 1</td><td>0</td></tr>
</table>

Continuation **“Main Menu”:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>004</td><td><u>Div. Switch %-f</u> <u>(Divergence switching point %-Hz)</u>:

The DS unit constantly compares the frequencies of Sensor1 and Sensor2 to the adjusted maximum allowed divergence. Application-specific a percentage comparison can be problematic with lower frequencies, so that a direct monitoring of the difference frequency in Hz can deliver better results.

This Parameter allows to define a limit. When undershooting the adjusted value the comparison will proceed no more percentages, but absolute in Hz.</td><td>0 - 999.99
(Hz)</td><td>100.00</td></tr>
<tr><td>005</td><td><u>Div. %-Value</u> <u>(maximum Divergence %)</u>:

Defines the maximum allowed percentage divergence between the frequencies of Sensor1 and Sensor2. If this value is exceeded, the unit switches to an error state. The calculation is specified by parameter "Div. Calculation ".</td><td>0 - 100
(%)</td><td>10</td></tr>
<tr><td>006</td><td><u>Div. f-Value</u> <u>(maximum Divergence Hz)</u>:

Defines the maximum allowed absolute divergence in Hz between the frequencies of Sensor1 and Sensor2. If the adjusted value is exceeded, the unit switches to an error status.</td><td>0 - 99.99
(Hz)</td><td>30.00</td></tr>
<tr><td>07</td><td><u>Div. Calculation</u> <u>(Divergence Calculation Mode)</u>:

This parameter will calculate the percentage divergence.

<table><tr><td>0</td><td>Reference value is the frequency of Sensor1:
△(%) = (Sensor1 - Sensor2) : Sensor1 x 100 %</td></tr><tr><td>1</td><td>Reference value is the frequency of Sensor2:
△(%) = (Sensor2 - Sensor1) : Sensor2 x 100 %</td></tr></table></td><td>0 - 1</td><td>0</td></tr>
</table>

<table>
<tr>
<td>008</td>
<td><u>Div. Filter</u>:

This digital filter parameter evaluates the divergence between Sensor1 and Sensor2.

<table>
<tr><td>0</td><td>The filter is not active:
The unit reacts immediately to each frequency deviation</td></tr>
<tr><td>5</td><td>Medium filter effect:
The unit tolerates temporary deviations and fluctuations, e. g. caused from torsion or mechanical vibrations and reacts delayed to deviations between both input frequencies</td></tr>
<tr><td>10</td><td>Higher filter effect:
The unit tolerates temporary deviations and fluctuations, e. g. caused from torsion or mechanical vibrations and reacts with a very long delay to prolonged deviations between both input frequencies</td></tr>
</table>
</td>
<td>0 - 20</td>
<td>1</td>
</tr>
</table>

Continuation **"Main Menu":**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>009</td><td><u>Error Simulation</u>:

This Parameter is only allowed in Programming Mode and serves exclusively for test purposes during the commissioning procedure. It allows to simulate and suppress error messages as follows:

<table>
<tr><td>0</td><td>Error state:
Sets the unit into error status. By using this parameter it is possible to check, if the entire follow-up system reacts correctly in case of errors.</td></tr>
<tr><td>1</td><td>Normal state:
Before exiting the Programming Mode, this parameter always must be set to 1.</td></tr>
<tr><td>2</td><td>Error clearing:
All errors reported by the unit will be reset.</td></tr>
</table>

A direct changeover between 0 and 2 should be avoided.

After the test, this parameter must be reset to default (=1).</td><td>0 - 2</td><td>1</td></tr>
<tr><td>010</td><td><u>Power-up Delay</u>:

A delay time setting is recommended to ensure a safely power up and enough time for stabilization after switching the encoder supply for all connected encoders. The evaluation of the encoder signals will start after the selected delay time has been elapsed.
This parameter can also be used to compensate different start-up times at power up.</td><td>0.001 - 9.999 (sec.)</td><td>0.100</td></tr>
<tr><td>011</td><td><u>SIN Error</u> <u>(activating or de-activating SIN/COS error)</u>:

This parameter allows activating or de-activating SIN/COS errors.
SIN Err TimeX defines a permitted time limit for each sensor. With setting 1, all SIN/COS errors are suppressed.
<table>
<tr><td>0</td><td>SIN/COS errors are evaluated.</td></tr>
<tr><td>1</td><td>All SIN/COS errors are suppressed.</td></tr>
</table></td><td>0 - 1</td><td>0</td></tr>
</table>

Continuation **“Main Menu”:**

<table>
<tr>
<td>012</td>
<td><u>Div. Mode</u> (Type of comparison<u></u><u>:</u>

This parameter defines the type of comparison for sensor evaluation. Frequency comparison compares the two sensor frequencies. Parameters 004 - 008 are relevant. Sensor Position Comparison compares the two sensor positions. Parameter 013 is relevant.

<table>
<tr><td>0</td><td>Frequency Comparison:
Differences between the two sensor frequencies results in a Run Time error.</td></tr>
<tr><td>1</td><td>Sensor Position Comparison:
Differences between the two sensor positons results in a Run Time error.</td></tr>
<tr><td>2</td><td>Frequency und Sensor Position Comparison:
Differences between the two sensor frequencies and the sensor positions results in a Run Time error.</td></tr>
</table>

Strongly fluctuating frequencies caused by step motors or elastic connections between the encoders, Sensor Position Comparison could be more stable.
Relationship between the encoders which are not adjusted by the parameter Multiplier and Divisor could cause cumulative errors. In this case Frequency comparison is more stable.
The SMC1.1 is normally used with Position Comparison.</td>
<td>0 - 2</td>
<td>0</td>
</tr>
<tr>
<td>013</td>
<td><u>Div. Inc-Value</u> (absolute deviation in increments<u></u><u>:</u>

This parameter defines the maximum acceptable deviation in increments by Sensor Position Comparison.
If value 1000 is set, a position deviation higher than 1000 or lower than -1000 increments results in a Run-Time error.
This parameter is only used by Sensor Position Comparison.

If the parameter is set to 0, no error is recognized.</td>
<td>0 - 9999999</td>
<td>0</td>
</tr>
</table>

Continuation **“Main Menu”:**

014	**Filter** (filtering the input frequencies): If value is set to 0, smoothing and filtering of the input frequencies will not be executed. The higher the value setting, the stronger the smoothing of the input frequencies, the lower the dynamic within frequency chances. A combination of Sampling Time and filtering is the best for smoothed input frequencies The Sampling Time affects more on high-frequency range (period time shorter than the Sampling Time). Filtering affects the frequency value determined after the Sampling Time resp. frequencies with period times longer than the Sampling Time. Frequencies > 1/Sampling Time: For Sampling Time = 1ms and Filter = 10, a value approx. 65 % is reached after 10 ms, 95 % after 30 ms and the final value is reached after 50 ms. A tenfold of the Sampling Time occurs a tenfold of the filtering time. Same for a tenfold of Parameter Filter and filtering time. The min. filter time is approx. 100 µs, up to two sampling periods. T (63 %) = Sampling Time x Filter T (95 %) = 3 x Sampling Time x Filter T (100 %) = 5 x Sampling Time x Filter Frequencies < 1/Sampling Time: In this case, you have to look at the period time = 1/f. For Filter = 10, after 10 periods a final value approx. 63 %, and after 30 periods a final value approx. 95 % is reached. T (63 %) = 1/f x Filter T (95 %) = 3 x 1/f x Filter T (100 %) = 5 x 1/f x Filter	0 - 999	0
015	**A-Edge 2/1** (edge evaluation with A Single)**:** This parameter is only active, if the operation mode is set to 2, 4, 5 or 9. The parameter refers to the A Single signal processing. Here every edge (A Edge 2/1=0) or every second edge (A Edge 2/1 = 1) can be evaluated. For signals with different pulse/pause times, the parameter must be set to 1 in order to detect a clear frequency. A faster reaction time is achieved by the setting of = 0	0 - 1	0

Continuation **“Main Menu”:**

<table>
<tr>
<td>016</td>
<td><u>Sensor Overlap</u>:
The overlap of the two sensors can be defined with this parameter in Op.-Mode = 5.

<table>
<tr><td>0</td><td>Off:
The overlap is disabled. No error evaluation occurs.</td></tr>
<tr><td>1</td><td>Error at low:
The overlap for both signals of the encoder is active. An error is triggered when both sensors are controlled with low.</td></tr>
<tr><td>2</td><td>Error at high:
The overlap for both signals of the encoder is active. An error is triggered when both sensors are controlled with high.</td></tr>
</table>
</td>
<td>0 - 2</td>
<td>0</td>
</tr>
</table>

2.3 Sensor1 Menu

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>017</td><td><u>Direction1</u>:
With SMC1.1 versions: Direction1 = Direction2
Parameter to assign the direction of Sensor1
<table><tr><td>0</td><td>No changes</td></tr><tr><td>1</td><td>Changes the sign of the direction</td></tr></table>This allows to reverse direction of Sensor1 in order to adapt Sensor1 to direction of Sensor2.</td><td>0 - 1</td><td>0</td></tr>
<tr><td>018</td><td><u>Multiplier1</u> (proportional pulse scaling factor):
With SMC1.1 versions: Multiplier1 = 1, Multiplier2 = 1
Is used to modulate the frequencies of Sensor 1 and Sensor2.
This scaling affects only the calculation of the divergence.</td><td>1 - 10 000</td><td>1</td></tr>
<tr><td>019</td><td><u>Divisor1</u> (reciprocal pulse scaling factor):
With SMC1.1 versions: Divisor1 = 1, Divisor = 1
To adjust the frequencies of Sensor1 and Sensor2.
This scaling affects only the calculation of the divergence.</td><td>1 - 10 000</td><td>1</td></tr>
<tr><td>020</td><td><u>Position Drift1</u> (drift monitoring at standstill):

With SMC1.1 versions: PositionDrift1 = PositionDrift2

This parameter handles drift movements at standstill. If the period time of the input frequency exceeds the adjusted „Wait-Time” parameter, the sensor is assigned to frequency = 0 Hz, even if a slow drift movement is present.

In case of an illegal drift, this parameter allows to preset an error threshold (symmetrical position window +/- xxx pulses). An error status is triggered if the adjusted value is exceeded.

The monitoring is only performed at standstill and begins at position 0, immediately when frequency = 0 Hz is detected.
<table><tr><td>0</td><td>Drift monitoring is not active</td></tr><tr><td>xxx</td><td>An error message appears, if the position is drifting out of the adjusted window of +/- xxx pulses (single edge evaluation).</td></tr></table></td><td>0 - 100 000</td><td>0</td></tr>
</table>

When using two encoders with differing pulse rates or in case of a mechanical reduction between both encoders, the higher frequency must be converted to the lower frequency by using the scaling factors.

Continuation **“Sensor1 Menu”:**

No.	Parameter	Range	Default
021	**Phase Err Count1** (faulty pulse counting limit)**:** The DS unit is able to detect incorrect pulse sequences as well as faulty phase positions. Normally, the parameter should remain set to 10. A different setting is useful only in special cases. The error status will be released if the adjusted number of faulty pulses is exceeded. Incorrect pulses can be caused by faulty wirings, EMC-problems, incorrect mode settings, when turn up the encoder supply or when reverse the direction Parameter.	1 - 1 000	10
022	**Set Frequency1** (simulation of a fixed encoder frequency)**:** This Parameter is used for test purposes and allows to substitute the real encoder frequency by a fixed frequency. The parameter is only effective, while the unit is in the Programming Mode and if the input is assigned to this function.	-500 000,00 - 500 000,00 (Hz)	0,00
023	**SIN Err Time1** (time until SIN/COS error will appear)**:** This parameter defines the time in 20 ms intervals, appearing a SIN/COS error. If the parameter is 1, every SIN/COS error longer than 20ms, results in a RUN Time error. If the parameter is 0, every SIN/COS error results in a RUN Time error. If SIN Error is 1, this parameter is disabled, no SIN/COS error will appear.	0 - 99	0

2.4 Sensor2 Menu

No.	Parameter		Range	Default
024	**Direction2:**	The functions of the Sensor2 parameters are identical to Sensor1 menu, but all settings are related to Sensor2 which is specified by the parameter „Operation Mode“.	0 - 1	0
025	**Multiplier2:**		1- 10 000	1
026	**Divisor2:**		1 - 10 000	1
027	**Position Drift2:**		0 - 100 000	0
028	**Phase Err Count2:**		1 - 1 000	10
029	**Set Frequency2:**		-500 000,00 - 500 000,00 (Hz)	0,00
030	**SIN Err Time2 :**		0 - 99	0

When using 2 encoders with differing pulse rates or in case of a mechanical reduction between both encoders, the higher frequency must be converted to the lower frequency by using the scaling factors.

2.5. Preselect Menu

This menu is used to set the switching points of the following outputs:

- 1 x relay output [X1 | RELAY OUT]
- 4 x control output [X2 | CONTROL OUT]

All limit values are related to the selected basic frequency (parameter “F1-F2 Selection”). The pulse-scaling does not influence the switching points.

Two separate switching points for each output are available, which allows e. g. to define the limit values for the setup mode and production mode. For this purpose, the function "Preselection Change" must be assigned to an unused control input (parameter “*IN* Function”).

A switchover between the switching points HIGH and LOW can only be released by an external command via control input at terminal [X10 | CONTROL IN]. The change will affect all outputs.

A switchover is only possible, if the control input is available by setting the parameter „Operational Mode”.

- Index .H means HIGH and requires definition of the higher limit value.
- Index .L means LOW and requires definition of the lower limit value.

Continuation **„Preselect Menu“**

No.	Parameter	Range	Default
031	**Preselect OUT1.H:** Upper switching point of output OUT1 [X2:1-2]	-500 000,00 - 500 000,00 (Hz) (defined by the „F1-F2 Selection“ parameter)	2 000,00
032	**Preselect OUT1.L:** Lower switching point of output OUT1 [X2:1-2]		1 000,00
033	**Preselect OUT1.D:** Maximum drift if parameter Switch Mode OUT1 = 17 or 18 Drift values are indicated in ¼ increments		0
034	**Preselect OUT2.H:** Upper switching point of output OUT2 [X2:3-4]		4 000,00
035	**Preselect OUT2.L:** Lower switching point of output OUT2 [X2:3-4]		3 000,00
036	**Preselect OUT2.D:** Maximum drift if parameter Switch Mode OUT2 = 17 or 18 Drift values are indicated in ¼ increments		0
037	**Preselect OUT3.H:** Upper switching point of output OUT3 [X2:5-6]		6 000,00
038	**Preselect OUT3.L:** Lower switching point of output OUT3 [X2:5-6]		5 000,00
039	**Preselect OUT3.D:** Maximum drift if parameter Switch Mode OUT3 = 17 or 18 Drift values are indicated in ¼ increments		0
040	**Preselect OUT4.H:** Upper switching point of output OUT4 [X2:7-8]		8 000,00
041	**Preselect OUT4.L:** Lower switching point of output OUT4 [X2:7-8]		7 000,00
042	**Preselect OUT4.D:** Maximum drift if parameter Switch Mode OUT4 = 17 or 18 Drift values are indicated in ¼ increments		0
043	**Preselect REL1.H:** Upper switching point of the relay output [X1:1-2]		200,00
044	**Preselect REL1.L:** Lower switching point of the relay output [X1:1-2]		100,00
045	**Preselect REL1.D:** Maximum drift if parameter Switch Mode REL1 = 17 or 18 Drift values are indicated in ¼ increments		0

<table>
<tr><td>046</td><td><u>Preselect OUT1.F</u>:
This parameter is for setting the frequency difference per unit of time for "Switch Mode OUT1" = 21 and 22.

Time = frequency [Hz] / setting [Hz/ms]

It follows: 1000 Hz / 0,1 [Hz/ms] = 10 000ms = 10s

<table>
<tr><th>Frequency</th><th>Setting</th><th>Time</th></tr>
<tr><td>10Hz</td><td>00,0010</td><td>10s</td></tr>
<tr><td>100Hz</td><td>00,0100</td><td>10s</td></tr>
<tr><td>1kHz</td><td>00,1000</td><td>10s</td></tr>
<tr><td>10kHz</td><td>01,0000</td><td>10s</td></tr>
<tr><td>100kHz</td><td>10,0000</td><td>10s</td></tr>
</table>

<table>
<tr><th>Frequency</th><th>Setting</th><th>Time</th></tr>
<tr><td>1kHz</td><td>1,0000</td><td>1s</td></tr>
<tr><td>1kHz</td><td>0,1000</td><td>10s</td></tr>
<tr><td>1kHz</td><td>0,0100</td><td>100s</td></tr>
</table>
</td><td>1 – 5000,0000</td><td>046</td></tr>
<tr><td>047</td><td><u>Preselect OUT2.F</u>:
This parameter is for setting the frequency difference per unit of time for "Switch Mode OUT2" = 21 and 22.
(see parameter Preselect OUT1.F)</td><td>1 – 5000,0000</td><td>1000,0000</td></tr>
<tr><td>048</td><td><u>Preselect OUT3.F</u>:
This parameter is for setting the frequency difference per unit of time for "Switch Mode OUT3" = 21 and 22.
(see parameter Preselect OUT1.F)</td><td>1 – 5000,0000</td><td>1000,0000</td></tr>
<tr><td>049</td><td><u>Preselect OUT4.F</u>:
This parameter is for setting the frequency difference per unit of time for "Switch Mode OUT4" = 21 and 22.
(see parameter Preselect OUT1.F)</td><td>1 – 5000,0000</td><td>1000,0000</td></tr>
<tr><td>050</td><td><u>Preselect REL1.F</u>:
This parameter is for setting the frequency difference per unit of time for "Switch Mode REL1 = 21 and 22.
(see parameter Preselect OUT1.F)</td><td>1 – 5000,0000</td><td>1000,0000</td></tr>
<tr><td>051</td><td>Reserved</td><td></td><td></td></tr>
</table>

- **The upper switching points (index .H) are only active, if no error can be detected and if the function Preselection Change is assigned to the control input.**
- **The operator has to assign the values to the switch-points correctly. The HIGH value must always be higher than the LOW value.**
- **The drift depends on the parameter "F1-F2 Selection" and thus refers to the selected encoder channel. Depending on the setting a drift error can set the output, but does not produce an error state**.

2.6 Switching Menu

This menu is used to set the switching conditions of the following outputs:

- 1 x relay output [X1 | RELAY OUT]
- 4 x control output [X2 | CONTROL OUT]

The following form of writing is used:

|f|	= absolute value of the basic frequency
|Preselection|	= absolute value of the switching point
f	= direction dependent, direction signed basic frequency
Preselection	= direction dependent, direction signed switching point

Additional output features:

{S}	= self-locking function
{H}	= switching hysteresis
{A}	= start up delay

- **With an active self-locking function no hysteresis setting is necessary, because no bouncing is possible.**
- **With an inactive self-locking function a hysteresis setting is always useful.**
- **When using Switch Mode 7 or 8, the specified standstill-time must be higher than the adjusted wipe period. This is helpful to prevent a breakdown of the wipe signal before the wipe period has been elapsed.**
- **With Switch Mode 2, 6 and 16, the parameter “Hysteresis” is used for determining the frequency band.**

Continuation **„Switching Menu“:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>052</td><td><u>Switch Mode OUT1</u> <u>(switching conditions for OUT1)</u>:

<table>
<tr><td>0</td><td>|f| >= |Preselection|
Output switches in event of overspeed.</td><td>{S, H}</td></tr>
<tr><td>1</td><td>|f| <= |Preselection|
Output switches in event of underspeed.</td><td>{S, H, A}</td></tr>
<tr><td>2</td><td>|f| == |Preselection|
Output switches in event of leaving the frequency band (Preselection +/- Hysteresis).</td><td>{S, A}</td></tr>
<tr><td>3</td><td>Standstill
Output switches in event of standstill.</td><td></td></tr>
<tr><td>4</td><td>f >= Preselection
Output switches in event of overspeed.</td><td>{S, H}</td></tr>
<tr><td>5</td><td>f <= Preselection
Output switches in event of underspeed.</td><td>{S, H, A}</td></tr>
<tr><td>6</td><td>f == Preselection
Output switches in event of leaving the frequency band (Preselection +/- Hysteresis).</td><td>{S, A}</td></tr>
<tr><td>7</td><td>f > 0
Output switches, if a positive frequency (e.g. clockwise direction) is detected. The directional information will be deleted immediately when „Standstill“ is detected.</td><td></td></tr>
<tr><td>8</td><td>f < 0
Output switches, if a negative frequency (e.g. anticlockwise direction) is detected. The directional information will be deleted immediately when „Standstill“ is detected.</td><td></td></tr>
<tr><td>9</td><td>Clock generation for pulsed readback
EDM and pulse monitored inputs</td><td></td></tr>
<tr><td>10</td><td>STO/SBC/SS1
Enable + external self-locking, without ramp monitoring</td><td>{S}</td></tr>
<tr><td>11</td><td>SLS |f| >= |Preselection|
Overspeed + enable + external self-locking, without ramp monitoring</td><td>{S}</td></tr>
<tr><td>12</td><td>SMS |f| >= |Preselection|
Overspeed without enable + external self-locking</td><td>{S}</td></tr>
</table></td><td>0 - 22</td><td>0</td></tr>
</table>

Continuation **„Switching Menu“:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>052</td><td>
<table>
<tr><td>13</td><td>SDI1 f > 0
Enable + external self-locking, frequency monitoring, no position monitoring</td><td>{S}</td></tr>
<tr><td>14</td><td>SDI2 f < 0
Enable + external self-locking, frequency monitoring, no position monitoring</td><td>{S}</td></tr>
<tr><td>15</td><td>SSM1 |f| <= |Preselection|
Underspeed + enable + external self-locking</td><td>{S}</td></tr>
<tr><td>16</td><td>SSM2 |f| within |Preselection +/- Hysteresis|
Underspeed + overspeed + enable + external self-locking</td><td>{S}</td></tr>
<tr><td>17</td><td>SOS/SLI/SS2 |f| > |Preselection| or Position Error
Overspeed + position + enable + self-locking</td><td>{S}</td></tr>
<tr><td>18</td><td>Standstill (at Standstill and no Position Error)
Standstill + position + enable + self-locking</td><td></td></tr>
<tr><td>19</td><td>Reserved</td><td></td></tr>
<tr><td>20</td><td>No standstill
This Mode operates like Mode 3, but only statically and the output is inverted. Here the inverted relay control is important. Output switches if f is not equal to Zero (no standstill)</td><td></td></tr>
<tr><td>21</td><td>Ramp monitoring 1
Under Speed + Overspeed + Enable + External self-locking
The condition is that the braking behaviour is linear. The parameter " Preselect XXXX.H/L" describes the slope. The parameter " Preselect XXXX.D“ in Hz describes the +/- deviation.</td><td>{S}</td></tr>
<tr><td>22</td><td>Ramp monitoring 2
Under Speed + Overspeed + Enable + External self-locking
The condition is that the braking behaviour is linear. The parameter " Preselect XXXX.H/L" describes the slope. The parameter " Preselect XXXX.D“ describes the +/- deviation.</td><td>{S}</td></tr>
</table>
</td><td>0 - 22</td><td>0</td></tr>
<tr><td>053</td><td><u>Switch Mode OUT2</u> <u>(switching condition for OUT2)</u>:
Settings are analogous to parameter „Switch Mode OUT1“</td><td>0 - 20</td><td>0</td></tr>
<tr><td>054</td><td><u>Switch Mode OUT3</u> <u>(switching condition for OUT3)</u>:
Settings are analogous to parameter „Switch Mode OUT1“</td><td>0 – 20</td><td>0</td></tr>
</table>

055	**Switch Mode OUT4** (switching condition for OUT4)**:** Settings are analogous to parameter „Switch Mode OUT1“	0 – 20	0
056	**Switch Mode REL1** (switching condition for the relay output)**:** Settings are analogous to parameter „Switch Mode OUT1“	0 - 20	0

- **With an active self-locking function no hysteresis setting is necessary, because no bouncing is possible.**
- **With an inactive self-locking function a hysteresis setting is always useful.**
- **When using Switch Mode 7 or 8, the specified standstill-time must be higher than the adjusted wipe period. This is helpful to prevent a breakdown of the wipe signal before the wipe period has been elapsed.**
- **With Switch Mode 2, 6 and 16, the parameter “Hysteresis” is used for determining the frequency band.**

Continuation **„Switching Menu“:**

No.	Parameter	Range	Default
057	**Pulse Time OUT1** (Wipe Signal Period of OUT1)**:** **0:** static wipe signal ≠**0:** wipe signal period in seconds	0 - 9.999 (sec.)	0,000
058	**Pulse Time OUT2** (Wipe Signal Period of OUT2)**:** Settings are analogous to parameter „Pulse Time OUT1“		
059	**Pulse Time OUT3** (Wipe Signal Period of OUT3)**:** Settings are analogous to parameter „Pulse Time OUT1“		
060	**Pulse Time OUT4** (Wipe Signal Period of OUT4)**:** Settings are analogous to parameter „Pulse Time OUT1“		
061	**Pulse Time REL1** (Wipe Signal Period of the relay)**:** Settings are analogous to parameter „Pulse Time OUT1“(min. 25 ms)		

- **The minimum wipe period of the control outputs is 1 msec. The minimum wipe period of the relay is 25 msec.**
- **If a wipe signal is adjusted, no self-locking function can be assigned to the corresponding output.**

062	**Hysteresis OUT1:** Percental hysteresis of the adjusted switching point of parameter „Preselect OUT1“	0 - 100.0 (%)	0,0
063	**Hysteresis OUT2:** Percental hysteresis of the adjusted switching point of parameter „Preselect OUT2“		
064	**Hysteresis OUT3:** Percental hysteresis of the adjusted switching point of parameter „Preselect OUT3“		
065	**Hysteresis OUT4:** Percental hysteresis of the adjusted switching point of parameter „Preselect OUT4“		
066	**Hysteresis REL1:** Percental hysteresis of the adjusted switching point of parameter „Preselect REL1“		

Continuation **„Switching Menu“:**

- **Due to the variance of the frequency measurement an output-bouncing around the limit value can occur. This behavior can be prevented by setting a hysteresis. A reasonable hysteresis value is approximately 1%.**
- **The setting of a hysteresis is only possible when the parameter "Switch Mode" is set to 0, 6 or 16.**

No.	Parameter	Range	Default
067	**Matrix OUT1** (enable matrix for output OUT1)**:** Defines the enable signal (for Switch Mode 10 … 18) of output OUT1 by input selection at terminal X10 as well as the remaining feedback outputs (see table below). An input as well as a feedback output can be used as enable signal (OR operation in case of several signals). **Bit 0** Input 1 [X10: 2] **Bit 1** Input 2 [X10: 3] **Bit 2** Input 3 [X10: 4] **Bit 3** Input 4 [X10: 5] **Bit 4** Output OUT1, not available here **Bit 5** Output OUT2 **Bit 6** Output OUT3 **Bit 7** Output OUT4 **Bit 8** Output REL1	0 - 511	0
068	**Matrix OUT2** (enable matrix for output OUT2)**:** **Bit 0** Input 1 [X10: 2] **Bit 1** Input 2 [X10: 3] **Bit 2** Input 3 [X10: 4] **Bit 3** Input 4 [X10: 5] **Bit 4** Output OUT1 **Bit 5** Output OUT2, not available here **Bit 6** Output OUT3 **Bit 7** Output OUT4 **Bit 8** Output REL1	0 - 511	0
069	**Matrix OUT3** (enable matrix for output OUT3)**:** **Bit 0** Input 1 [X10: 2] **Bit 1** Input 2 [X10: 3] **Bit 2** Input 3 [X10: 4] **Bit 3** Input 4 [X10: 5] **Bit 4** Output OUT1 **Bit 5** Output OUT2 **Bit 6** Output OUT3, not available here **Bit 7** Output OUT4 **Bit 8** Output REL1	0 - 511	0

Continuation **„Switching Menu“:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>070</td><td><u>Matrix OUT4</u> <u>(enable matrix for output OUT4)</u><u>:</u>
<table><tr><td>Bit 0</td><td>Input 1 [X10: 2]</td></tr><tr><td>Bit 1</td><td>Input 2 [X10: 3]</td></tr><tr><td>Bit 2</td><td>Input 3 [X10: 4]</td></tr><tr><td>Bit 3</td><td>Input 4 [X10: 5]</td></tr><tr><td>Bit 4</td><td>Output OUT1</td></tr><tr><td>Bit 5</td><td>Output OUT2</td></tr><tr><td>Bit 6</td><td>Output OUT3</td></tr><tr><td>Bit 7</td><td>Output OUT4, not available here</td></tr><tr><td>Bit 8</td><td>Output REL1</td></tr></table></td><td>0 - 511</td><td>0</td></tr>
<tr><td>071</td><td><u>Matrix REL1</u> <u>(enable matrix for output REL1):</u>
<table><tr><td>Bit 0</td><td>Input 1 [X10: 2]</td></tr><tr><td>Bit 1</td><td>Input 2 [X10: 3]</td></tr><tr><td>Bit 2</td><td>Input 3 [X10: 4]</td></tr><tr><td>Bit 3</td><td>Input 4 [X10: 5]</td></tr><tr><td>Bit 4</td><td>Output OUT1</td></tr><tr><td>Bit 5</td><td>Output OUT2</td></tr><tr><td>Bit 6</td><td>Output OUT3</td></tr><tr><td>Bit 7</td><td>Output OUT4</td></tr><tr><td>Bit 8</td><td>Output REL1, not available here</td></tr></table></td><td>0 - 511</td><td>0</td></tr>
<tr><td>072</td><td><u>MIA-Delay OUT1</u> <u>(delay for transition inactive to active)</u><u>:</u>
Matrix delay inactive to active for output OUT1 (in seconds). This setting will delay the enable function, if the enable input or the feedback output changes from inactive to active.</td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>073</td><td><u>MIA-Delay OUT2</u> <u>(delay for transition inactive to active)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>074</td><td><u>MIA-Delay OUT3</u> <u>(delay for transition inactive to active)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>075</td><td><u>MIA-Delay OUT4</u> <u>(delay for transition inactive to active)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>076</td><td><u>MIA-Delay REL1</u> <u>(delay for transition inactive to active)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>077</td><td><u>MAI-Delay OUT1:</u> <u>(delay for transition active to inactive)</u><u>:</u>
Matrix delay active to inactive for output OUT1 (in seconds). This setting will delay the enable function, if the enable input or the feedback output changes from active to inactive.</td><td>0 - 99.999 (sec.)</td><td>0,000</td></tr>
<tr><td>078</td><td><u>MAI-Delay OUT2</u> <u>(delay for transition active to inactive)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>079</td><td><u>MAI-Delay OUT3</u> <u>(delay for transition active to inactive)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>080</td><td><u>MAI-Delay OUT4</u> <u>(delay for transition active to inactive)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
<tr><td>081</td><td><u>MAI-Delay REL1</u> <u>(delay for transition active to inactive)</u><u>:</u></td><td>0 - 99.999(sec.)</td><td>0,000</td></tr>
</table>

Continuation **„Switching Menu“:**

No.	Parameter	Range	Default
082	**Delay OUT1** (Delay of the tripping for OUT1)**:** Trip delay for the output OUT1 in seconds. This delay delays the tripping of OUT1. If the output has been reset before the delay time has expired, no change of state takes place at OUT1. The return takes place without delay. Oscillating releases and their recall ensure that the delay time restarts. If a wiping time is activated, a new wiping impulse can be issued only after recall and after the expiry of the delay time. Does not apply to Switch Mode = 3, 9,1 0 and 20	0 - 9,999 (sec.)	0,000
083	**Delay OUT2** (Delay of the tripping for OUT2)**:**	0 - 9,999 (sec.)	0,000
084	**Delay OUT3** (Delay of the tripping for OUT3)**:**	0 - 9,999 (sec.)	0,000
085	**Delay OUT4** (Delay of the tripping for OUT4)**:**	0 - 9,999 (sec.)	0,000
086	**Delay REL1** (Delay of the tripping for REL1)**:**	0 - 9,999 (sec.)	0,000

Continuation **„Switching Menu“:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>087</td><td><u>Start-up Mode</u> <u>(start-up delay time window)</u>:

Window for delay time until the monitoring function is activated.
Only useful in combination with parameter setting „Switch Mode“ = 1, 2, 5 oder 6.

To use the start-up delay, it must be assigned to an output.

The start-up delay will be activated:
- with next power-up
- always when after standstill a frequency is detected again

<table>
<tr><td>0</td><td>no start-up delay</td></tr>
<tr><td>1</td><td>start-up delay 1 second</td></tr>
<tr><td>2</td><td>start-up delay 2 seconds</td></tr>
<tr><td>3</td><td>start-up delay 4 seconds</td></tr>
<tr><td>4</td><td>start-up delay 8 seconds</td></tr>
<tr><td>5</td><td>start-up delay 16 seconds</td></tr>
<tr><td>6</td><td>start-up delay 32 seconds</td></tr>
<tr><td>7</td><td>start-up delay 64 seconds</td></tr>
<tr><td>8</td><td>start-up delay 128 seconds</td></tr>
<tr><td>9</td><td>automatically, until the value has been exceeded for the first time</td></tr>
</table>

The defined delay time window is valid for all outputs.</td><td>0 - 9</td><td>0</td></tr>
<tr><td>088</td><td><u>Startup Output</u> <u>(assignment of a start-up delay to outputs)</u>:

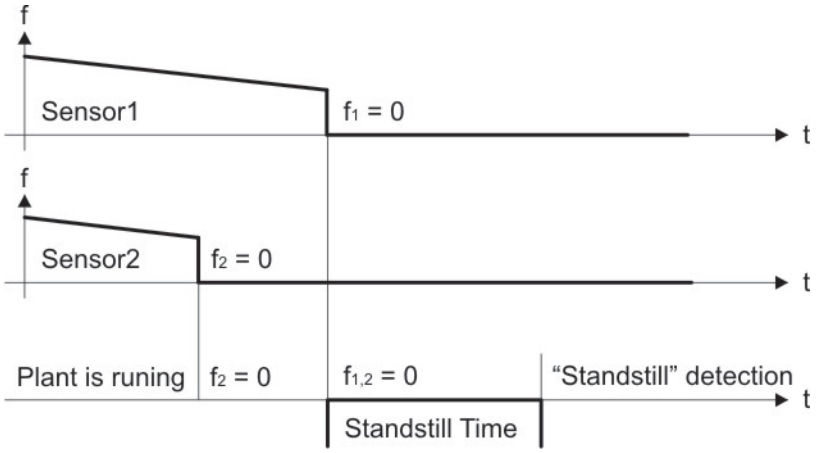
By using a 5 bit binary code the start-up delay function can be assigned to an output. Settings see below:

<table>
<tr><th>Output:</th><th>RELAY</th><th>OUT4</th><th>OUT3</th><th>OUT2</th><th>OUT1</th></tr>
<tr><td>Bit:</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>Binary:</td><td>10000</td><td>01000</td><td>00100</td><td>00010</td><td>00001</td></tr>
<tr><td>Value:</td><td>16</td><td>8</td><td>4</td><td>2</td><td>1</td></tr>
</table>

Example: A setting of Startup Output = 17 (binary 10001) means that
a start-up delay is assigned to OUT1 and to the RELAY output.</td><td>0 - 31</td><td>0</td></tr>
</table>

Continuation **“Switching Menu”:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>089</td><td><u>Standstill Time</u> <u>(delay time for standstill detection)</u>:

This parameter defines the delay time until the unit detects a standstill after detecting frequency = 0 Hz.
 

Prior condition is that both input frequencies are detected as „Zero“
($f_{1,2}$ = 0 Hz). From that moment, the standstill period runs off and indicates a standstill when elapsed.</td><td>0 - 9.999
(sec.)</td><td>0,000</td></tr>
<tr><td>090</td><td><u>Lock Output</u> <u>(assignment of a lock-function to an output)</u>:

The assignment of a self-locking-function to an output can be adjusted by using a 6 bit binary code as follows:

<table>
<tr><td>Output:</td><td>*</td><td>RELAY</td><td>OUT4</td><td>OUT3</td><td>OUT2</td><td>OUT1</td></tr>
<tr><td>Bit</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>Binary:</td><td>100000</td><td>010000</td><td>001000</td><td>000100</td><td>000010</td><td>000001</td></tr>
<tr><td>Value:</td><td>32</td><td>16</td><td>8</td><td>4</td><td>2</td><td>1</td></tr>
</table>
Bits 1 to 5 are used to assign the lock function to the respective outputs.

*) The highest valued bit 6 determines if a locked output can be released exclusively by an external input signal via parameter “*IN* Function” (bit 6 = 0) or additionally by an automatic reset when standstill is indicated (bit 6 = 1).

Example:
An adjustment of Lock Output = 17 (binary 10001) means that a lock is assigned to output OUT1 and to the relay, which can be deactivated exclusively by an external input signal.

Further the adjustment Lock Output = 49 (binary 110001) means that the lock-functions of OUT1 and the relay are deleted additionally when standstill is detected.

Please note: With an active wipe time setting, no self-locking function can be assigned to the corresponding output.</td><td>0 - 63</td><td>0</td></tr>
</table>

Continuation **“Switching Menu”:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>091</td><td>

Action Output (output selection for overwriting)**:**

The function to set fixed output conditions for OUT1 to OUT4 is only effective in the Programming Mode. It is used for test purposes and allows to force each output to a defined switching condition.

The „Action Output“ parameter selects the outputs to be tested.
The next Parameter „Action Polarity“ is used to assign the desired switching conditions to the selected outputs.

The outputs are selectable by using a 5 bit binary code:

<table>
<tr><th>Output:</th><th>RELAY</th><th>OUT4</th><th>OUT3</th><th>OUT2</th><th>OUT1</th></tr>
<tr><td>Bit</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>Binary:</td><td>10000</td><td>01000</td><td>00100</td><td>00010</td><td>00001</td></tr>
<tr><td>Value:</td><td>16</td><td>8</td><td>4</td><td>2</td><td>1</td></tr>
</table>

Example: A setting of Action Output = 14 (binary 01110) means that the outputs OUT2, OUT3 and OUT4 are selected for overwriting.

<table>
<tr><th>REL</th><th>0</th><th>No overwriting</th></tr>
<tr><td>OUT4</td><td>1</td><td>Status see parameter “Action Polarity”</td></tr>
<tr><td>OUT3</td><td>1</td><td>Status see parameter “Action Polarity”</td></tr>
<tr><td>OUT2</td><td>1</td><td>Status see parameter “Action Polarity“</td></tr>
<tr><td>OUT1</td><td>0</td><td>No overwriting</td></tr>
</table>

After the test this parameter must be reset to default (= 0).

</td><td>0 - 31</td><td>0</td></tr>
</table>

Continuation **“Switching Menu”:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>092</td><td>

<u>Action Polarity</u> <u>(setting the output conditions)</u>**:**

This setting-function is only effective in the Programming Mode and requires a selection of the corresponding outputs by the parameter “Action Output”.

The output-conditions are assignable by a 9 bit binary code:

<table>
<tr><td>OUT:</td><td>REL</td><td>4</td><td>/4</td><td>3</td><td>/3</td><td>2</td><td>/2</td><td>1</td><td>/1</td></tr>
<tr><td>Bit:</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>Binary:</td><td>1 0000 0000</td><td>0 1000 0000</td><td>0 0100 0000</td><td>0 0010 0000</td><td>0 0001 0000</td><td>0 0000 1000</td><td>0 0000 0100</td><td>0 0000 0010</td><td>0 0000 0001</td></tr>
<tr><td>Value:</td><td>256</td><td>128</td><td>64</td><td>32</td><td>16</td><td>8</td><td>4</td><td>2</td><td>1</td></tr>
</table>

Example: A setting of Action Output = 275 (binary 1 0001 0011) causes the following output conditions:

<table>
<tr><th>REL</th><th>1</th><th>Contact closed</th></tr>
<tr><td>OUT4</td><td>0</td><td>LOW</td></tr>
<tr><td>/OUT4</td><td>0</td><td>LOW</td></tr>
<tr><td>OUT3</td><td>0</td><td>LOW</td></tr>
<tr><td>/OUT3</td><td>1</td><td>HIGH</td></tr>
<tr><td>OUT2</td><td>0</td><td>LOW</td></tr>
<tr><td>/OUT2</td><td>0</td><td>LOW</td></tr>
<tr><td>OUT1</td><td>1</td><td>HIGH</td></tr>
<tr><td>/OUT1</td><td>1</td><td>HIGH</td></tr>
</table>

After the test, this parameter must be reset to default (= 0).

</td><td>0 - 511</td><td>0</td></tr>
<tr><td>093</td><td>

<u>Read Back OUT</u> <u>(output for the EDM function)</u>**:**

Defines the read back output for the EDM function - with respect to inverting or non-inverting.

<table>
<tr><td>Bit 0</td><td>= 0 EDM function of OUT1
= 1 EDM function of /OUT1</td></tr>
<tr><td>Bit 1</td><td>= 0 EDM function of OUT2
= 1 EDM function of /OUT2</td></tr>
<tr><td>Bit 2</td><td>= 0 EDM function of OUT3
= 1 EDM function of /OUT3</td></tr>
<tr><td>Bit 3</td><td>= 0 EDM function of OUT4
= 1 EDM function of /OUT4</td></tr>
<tr><td>Bit 4</td><td>= 0 EDM function of REL1
= 1 EDM function of REL1 (inverted)</td></tr>
</table>

</td><td>0 - 31</td><td>0</td></tr>
</table>

Continuation **„Switching Menu“:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>094</td><td><u>Output Mode</u> (output configuration)<u>:</u>
Defines the configuration of the outputs:
<table><tr><td>Bit 0</td><td>= 0 OUT1 and /OUT1 are inverse
= 1 OUT1 and /OUT1 are homogeneously</td></tr><tr><td>Bit 1</td><td>= 0 OUT2 and /OUT2 are inverse
= 1 OUT2 and /OUT2 are homogeneously</td></tr><tr><td>Bit 2</td><td>= 0 OUT3 and /OUT3 are inverse
= 1 OUT3 and /OUT3 are homogeneously</td></tr><tr><td>Bit 3</td><td>= 0 OUT3 and /OUT4 are inverse
= 1 OUT3 and /OUT4 are homogeneously</td></tr></table></td><td>0 - 15</td><td>0</td></tr>
<tr><td>095</td><td>Reserved</td><td></td><td></td></tr>
<tr><td>096</td><td>Reserved</td><td></td><td></td></tr>
<tr><td>097</td><td>Reserved</td><td></td><td></td></tr>
<tr><td>098</td><td>Reserved</td><td></td><td></td></tr>
<tr><td>099</td><td>Reserved</td><td></td><td></td></tr>
</table>

- **With homogeneous outputs, all inputs will be pulled down to GND in case of power or hardware failure. Thereby an error state cannot be clearly transmitted to another device by these outputs.**
- **Using homogeneous outputs will reduce the Safety Integrity Level (SIL).**

2.7. Control Menu

This chapter describes the features and configuration options of the control inputs. Depending on the mode (parameter “Operational Mode”) two up to four HTL/PNP control inputs are available at the terminal [X10 | CONTROL IN].

Three different input configurations can be set by the parameter „Input Mode“:

- **Two 2-pole inputs (IN1, /IN1 + IN2, /IN2)**
  The control inputs are either homogeneous or inversely. In this case each input requires a dual signal.

Signal pair 1	[X10: 2] **LOW**	[X10: 3] **LOW**	Error if inverse	Configuration by parameter „IN1 Function“ and „IN1 Config“
	[X10: 2] **LOW**	[X10: 3] **HIGH**	Error if homogeneously	
	[X10: 2] **HIGH**	[X10: 3] **LOW**	Error if homogeneously	
	[X10: 2] **HIGH**	[X10: 3] **HIGH**	Error if inverse	
Signal pair 2	[X10: 4] **LOW**	[X10: 5] **LOW**	Error if inverse	Configuration by parameter „IN2 Function“ and „IN2 Config“
	[X10: 4] **LOW**	[X10: 5] **HIGH**	Error if homogeneously	
	[X10: 4] **HIGH**	[X10: 5] **LOW**	Error if homogeneously	
	[X10: 4] **HIGH**	[X10: 5] **HIGH**	Error if inverse	

- **One 2-pole input (IN1, /IN1) and two 1-pole inputs (IN2 + /IN2)**
  The 2-pole input is either homogeneous or inversely. The 2-pole control input requires a dual signal, while the 1-pole inputs only require a single signal. Thus three independent inputs are available.

Signal pair 1	[X10: 2] **LOW**	[X10: 3] **LOW**	Error if inverse	Configuration by parameter „IN1 Function“ and „IN1 Config“
	[X10: 2] **LOW**	[X10: 3] **HIGH**	Error if homogeneously	
	[X10: 2] **HIGH**	[X10: 3] **LOW**	Error if homogeneously	
	[X10: 2] **HIGH**	[X10: 3] **HIGH**	Error if inverse	
Signal 2	[X10: 4] **LOW**		Configuration by parameter „IN2 Function“ and „IN2 Config“	
	[X10: 4] **HIGH**			
Signal 3	[X10: 5] **LOW**		Configuration by parameter „/IN2 Function“ and „/IN2 Config“	
	[X10: 5] **HIGH**			

- **Four 1-pole inputs (IN1 + /IN1 + IN2 + /IN2)**
  The 1-pole inputs require only a single signal. Thus four independent inputs are available.

Signal 1	[X10: 2] **LOW**	Configuration by parameter „IN1 Function“ and „IN1 Config“
	[X10: 2] **HIGH**	
Signal 2	[X10: 3] **LOW**	Configuration by parameter „/IN1 Function“ and „/IN1 Config“
	[X10: 3] **HIGH**	
Signal 3	[X10: 4] **LOW**	Configuration by parameter „IN2 Function“ and „IN2 Config“
	[X10: 4] **HIGH**	
Signal 4	[X10: 5] **LOW**	Configuration by parameter „/IN2 Function“ and „/IN2 Config“
	[X10: 5] **HIGH**	

Continuation **„Control Menu“**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>100</td><td>
<u>**IN1 Function** (assigns a function to input [X10 : 2]):</u>
This parameter defines the input function. The respective switching behavior can be specified by using the “IN1 Config” parameter.
<table>
<tr><td>**0**</td><td>No function assigned</td><td></td></tr>
<tr><td>**1**</td><td>Release lock of output OUT1</td><td>**[dyn]**</td></tr>
<tr><td>**2**</td><td>Release lock of output OUT2</td><td>**[dyn]**</td></tr>
<tr><td>**3**</td><td>Release lock of output OUT3</td><td>**[dyn]**</td></tr>
<tr><td>**4**</td><td>Release lock of output OUT4</td><td>**[dyn]**</td></tr>
<tr><td>**5**</td><td>Release lock of output REL1</td><td>**[dyn]**</td></tr>
<tr><td>**6**</td><td>Release all output locks together</td><td>**[dyn]**</td></tr>
<tr><td>**7**</td><td>Set Frequency1
Frequency simulation of Sensor1</td><td>**[stat]**
[PRG]</td></tr>
<tr><td>**8**</td><td>Set Frequency2
Frequency simulation of Sensor2</td><td>**[stat]**
[PRG]</td></tr>
<tr><td>**9**</td><td>Set Frequency12
Frequency simulation of Sensor1 und Sensor2</td><td>**[stat]**
[PRG]</td></tr>
<tr><td>**10**</td><td>Freeze Frequency1
Freezes the actual encoder frequency of Sensor1</td><td>**[stat]**
[PRG]</td></tr>
<tr><td>**11**</td><td>Freeze Frequency2
Freezes the actual encoder frequency of Sensor2</td><td>**[stat]**
[PRG]</td></tr>
<tr><td>**12**</td><td>Freeze Frequency12
Freezes the encoder frequency of Sensor1 and Sensor2</td><td>**[stat]**
[PRG]</td></tr>
<tr><td>**13**</td><td>Preselection Change
Switchover between the upper and lower switching point. The changeover takes effect to all outputs.</td><td>**[stat]**</td></tr>
<tr><td>**14**</td><td>Clear Drift1
Clears the counter of position drift 1.</td><td>**[dyn]**</td></tr>
<tr><td>**15**</td><td>Clear Drift2
Clears the counter of position drift 2</td><td>**[dyn]**</td></tr>
<tr><td>**16**</td><td>Clear Drift12
Clears both counters (position drift 1 and 2)</td><td>**[dyn]**</td></tr>
<tr><td>**17**</td><td>EDM function of OUT1 or /OUT1</td><td></td></tr>
<tr><td>**18**</td><td>EDM function of OUT2 or /OUT2</td><td></td></tr>
<tr><td>**19**</td><td>EDM function of OUT3 or /OUT3</td><td></td></tr>
<tr><td>**20**</td><td>EDM function of OUT4 or /OUT4</td><td></td></tr>
<tr><td>**21**</td><td>Enable input for the output function of parameter „Switch Mode“ = 10 - 18</td><td>**[stat]**</td></tr>
<tr><td>**22**</td><td>EDM function for REL1</td><td></td></tr>
</table>
[dyn] = dynamic function if a rising edge appears at the input
[stat] = static permanent function
[PRG] = function only in the “Programming Mode” active
</td><td>0 - 22</td><td>0</td></tr>
</table>

In case of simultaneous commands "Set Frequency" and "Frequency freeze" via both control inputs, the function "Set Frequency" has priority.

Continuation **„Control Menu“**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>101</td><td><u>IN1 Config</u> <u>(switching behavior of input [X10 : 2]):</u>

This parameter defines the switching behavior of the input.
The respective function assignment can be specified by using the
“IN1 Function” parameter.

<table>
<tr><td>0</td><td>Inverse dual channel input (statically, LOW)</td></tr>
<tr><td>1</td><td>Inverse dual channel input (statically, HIGH)</td></tr>
<tr><td>2</td><td>Inverse dual channel input (dynamically, LOW)</td></tr>
<tr><td>3</td><td>Inverse dual channel input (dynamically, HIGH)</td></tr>
<tr><td>4</td><td>Homogeneous dual channel input (statically, LOW)</td></tr>
<tr><td>5</td><td>Homogeneous dual channel input (statically, HIGH)</td></tr>
<tr><td>6</td><td>Homogeneous dual channel input (dynamically, LOW)</td></tr>
<tr><td>7</td><td>Homogeneous dual channel input (dynamically, HIGH)</td></tr>
<tr><td>8</td><td>Single channel input (statically, LOW)</td></tr>
<tr><td>9</td><td>Single channel input (statically, HIGH)</td></tr>
<tr><td>10</td><td>Single channel input (dynamically, LOW)</td></tr>
<tr><td>11</td><td>Single channel input (dynamically, HIGH)</td></tr>
<tr><td>12</td><td>Single channel input EDM clock of OUT1</td></tr>
<tr><td>13</td><td>Single channel input EDM clock of /OUT1</td></tr>
<tr><td>14</td><td>Single channel input EDM clock of OUT2</td></tr>
<tr><td>15</td><td>Single channel input EDM clock of /OUT2</td></tr>
<tr><td>16</td><td>Single channel input EDM clock of OUT3</td></tr>
<tr><td>17</td><td>Single channel input EDM clock of /OUT3</td></tr>
<tr><td>18</td><td>Single channel input EDM clock of OUT4</td></tr>
<tr><td>19</td><td>Single channel input EDM clock of /OUT4</td></tr>
<tr><td>20</td><td>Pulsed single channel input of OUT1 (statically, HIGH)</td></tr>
<tr><td>21</td><td>Pulsed single channel input of /OUT1 (statically, HIGH)</td></tr>
<tr><td>22</td><td>Pulsed single channel input of OUT2 (statically, HIGH)</td></tr>
<tr><td>23</td><td>Pulsed single channel input of /OUT2 (statically, HIGH)</td></tr>
<tr><td>24</td><td>Pulsed single channel input of OUT3 (statically, HIGH)</td></tr>
<tr><td>25</td><td>Pulsed single channel input of /OUT3 (statically, HIGH)</td></tr>
<tr><td>26</td><td>Pulsed single channel input of OUT4 (statically, HIGH)</td></tr>
<tr><td>27</td><td>Pulsed single channel input of /OUT4 (statically, HIGH)</td></tr>
<tr><td>28</td><td>Pulsed single channel input of OUT1 (statically, LOW)</td></tr>
</table>
</td><td>0 - 35</td><td>0</td></tr>
</table>

		29	Pulsed single channel input of /OUT1 (statically, LOW))		
		30	Pulsed single channel input of OUT2 (statically, LOW)		
		31	Pulsed single channel input of /OUT2 (statically, LOW)		
		32	Pulsed single channel input of OUT3 (statically, LOW)		
		33	Pulsed single channel input of /OUT3 (statically, LOW)		
		34	Pulsed single channel input of OUT4 (statically, LOW)		
		35	Pulsed single channel input of /OUT4 (statically, LOW)		

Continuation **„Control Menu“**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>102</td><td><u>/IN1 Config</u> <u>(switching behavior of input [X10 : 3]):</u>

The functions are identical to the parameter "IN1 Function"</td><td>0 - 22</td><td>0</td></tr>
<tr><td>103</td><td><u>/IN1 Config</u> <u>(switching behavior of input [X10 : 3]):</u>

The functions are identical to the parameter "IN1 Config"</td><td>0 - 35</td><td>0</td></tr>
<tr><td>104</td><td><u>IN2 Config</u> <u>(switching behavior of input [X10 : 4]):</u>

The functions are identical to the parameter "IN1 Function"</td><td>0 - 22</td><td>0</td></tr>
<tr><td>105</td><td><u>IN2 Config</u> <u>(switching behavior of input [X10 : 4]):</u>

The functions are identical to the parameter "IN1 Config"</td><td>0 - 35</td><td>0</td></tr>
<tr><td>106</td><td><u>/IN2 Config</u> <u>(switching behavior of input [X10 : 5]):</u>

The functions are identical to the parameter "IN1 Function"</td><td>0 - 22</td><td>0</td></tr>
<tr><td>107</td><td><u>/IN2 Config</u> <u>(switching behavior of input [X10 : 5]):</u>

The functions are identical to the parameter "IN1 Config"</td><td>0 - 35</td><td>0</td></tr>
<tr><td>108</td><td><u>Input Mode</u> <u>(input configuration)</u>:

Defines the input types:

<table><tr><td>0</td><td>Two dual-channel input pairs</td></tr><tr><td>1</td><td>One dual-channel input pair and two single inputs</td></tr><tr><td>2</td><td>Four single-ended inputs</td></tr></table></td><td>0 - 2</td><td>0</td></tr>
<tr><td>109</td><td><u>Read Back Delay</u> <u>(time until the read back is active again)</u>:

Bounce time delay for an external relay of the EDM function</td><td>0,000 - 1,000
(sec.)</td><td>0,000</td></tr>
<tr><td>110</td><td><u>GPI Err Time</u> <u>(value 1 corresponds to an error time of approx. 1 ms):</u>

After this time, illegal conditions at the GPI Input results in an error.
A default value of 10 corresponds to an error time of approx. 10 ms.</td><td>1 - 999</td><td>10</td></tr>
</table>

2.8. Serial Menu

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>111</td><td><u>Serial Unit No.</u> <u>(assigns a serial unit number)</u>:
The devices can be assigned by unit numbers between 11 and 99 (default = 11).
Please note: Unit numbers must not contain a 0 because these numbers are reserved for group- or bulk-addressing.</td><td>11 - 99</td><td>11</td></tr>
<tr><td>112</td><td><u>Serial Baud Rate</u> <u>(serial transmission speed)</u>:
<table>
<tr><td>0</td><td>9 600 Baud</td></tr>
<tr><td>1</td><td>4 800 Baud</td></tr>
<tr><td>2</td><td>2 400 Baud</td></tr>
<tr><td>3</td><td>1 200 Baud</td></tr>
<tr><td>4</td><td>600 Baud</td></tr>
<tr><td>5</td><td>19 200 Baud</td></tr>
<tr><td>6</td><td>38 400 Baud</td></tr>
<tr><td>7</td><td>56 000 Baud</td></tr>
<tr><td>8</td><td>57 600 Baud</td></tr>
<tr><td>9</td><td>76 800 Baud</td></tr>
<tr><td>10</td><td>115 200 Baud</td></tr>
</table></td><td>0 - 10</td><td>0</td></tr>
<tr><td>113</td><td><u>Serial Format</u> <u>(format of the serial data)</u>:
<table>
<tr><td>0:</td><td>7 data bits, parity even, 1 stop bit</td></tr>
<tr><td>1:</td><td>7 data bits, parity even, 2 stop bits</td></tr>
<tr><td>2:</td><td>7 data bits, parity odd, 1 stop bit</td></tr>
<tr><td>3:</td><td>7 data bits, parity odd, 2 stop bits</td></tr>
<tr><td>4:</td><td>7 data bits, no parity*, 1 stop bit</td></tr>
<tr><td>5:</td><td>7 data bits, no parity*, 2 stop bits</td></tr>
<tr><td>6:</td><td>8 data bits, parity even, 1 stop bit</td></tr>
<tr><td>7:</td><td>8 data bits, parity odd, 1 stop bit</td></tr>
<tr><td>8:</td><td>8 data bits, no parity*, 1 stop bit</td></tr>
<tr><td>9:</td><td>8 data bits, no parity*, 2 stop bits</td></tr>
</table></td><td>0 - 9</td><td>0</td></tr>
</table>

***) With setting „no parity“ no secure data transmission guaranteed.**
For a secure data transmission „Parity even“ or „Parity odd“ must be selected.

Continuation **„Serial Menu“:**

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>114</td><td><u>Serial Page</u> <u>(serial page number of a variable)</u>:

The Parameter serves only for diagnosis purposes by the manufacturer.</td><td>0 - 16</td><td>0</td></tr>
<tr><td>115</td><td><u>Serial Init:</u>

This parameter determines the baud rate for the transmission of the initialization values to the operator surface OSxx respectively to the SMCB.1 programming and display unit.

<table>
<tr><td>0</td><td>The initialization values will be transmitted with 9600 baud. After that, the unit returns back to the baud rate set by the user.</td></tr>
<tr><td>1</td><td>The initialization values will be transmitted with the user setting. After that, the unit continues with this baud rate.</td></tr>
</table>

With settings higher than 9600 baud the duration of the initialization can be shortened.</td><td>0 - 1</td><td>0</td></tr>
<tr><td>116</td><td>Reserved</td><td></td><td></td></tr>
</table>

2.9. Splitter Menu

(Looping of Sensor Signals for further Target Units)

The Splitter function is only integrated in SMC2.2 and SMC1.1.

<table>
<tr><th>No.</th><th>Parameter</th><th>Range</th><th>Default</th></tr>
<tr><td>117</td><td><u>RS Selector</u> <u>(determination of the RS422 output source)</u>:

This parameter defines which input frequency (Sensor1 or Sensor2) is exported at terminal [X4 | RS422 OUT].

The assignment of channels for sensor1 and sensor 2 is specified by the parameter „Operational Mode“.

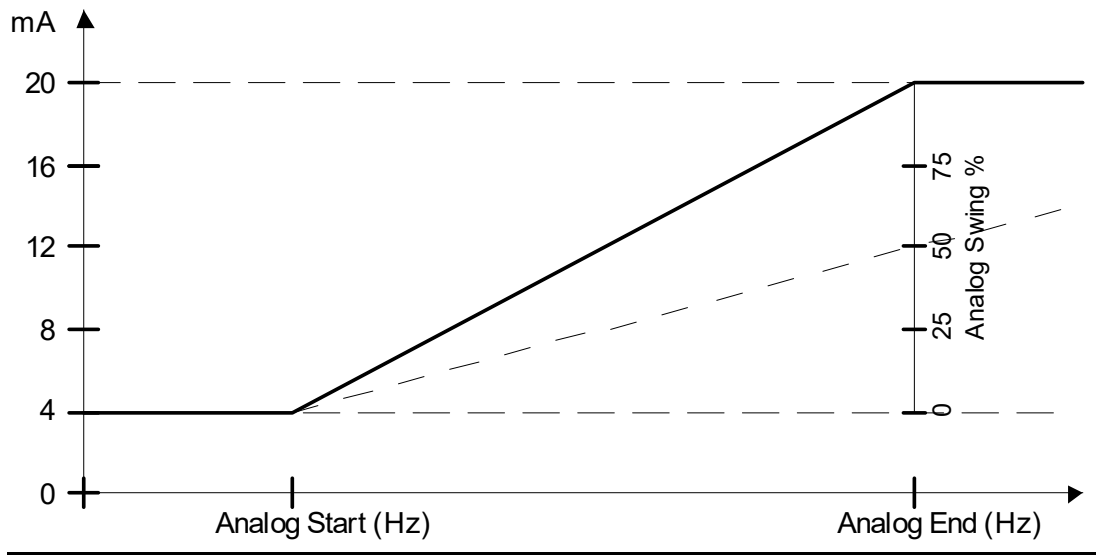
<table>
<tr><td>0</td><td>Sensor1
A copy of the Sensor1 frequency appears at terminal [X4 | RS422 OUT]</td></tr>
<tr><td>1</td><td>Sensor2
A copy of the Sensor2 frequency appears at terminal [X4 | RS422 OUT]</td></tr>
</table>

Independent from the input signal, always incremental RS422 square-wave pulses are generated.

SinCos signals are converted to incremental signals with 1 pulse / period (without an interpolation).</td><td>0 - 1</td><td>0</td></tr>
</table>

2.10. Analog Menu
(Analog Output Configuration)

The setting of parameter “F1-F2-Selection” determines whether the frequency of Sensor1 or Sensor2 is used to generate the analog output signal.

No.	Parameter	Range	Default
118	**Analog Start** (initial value of the conversion range in Hz)**:** Defines the initial frequency, at which the analog output should set its initial value of 4 mA.	-500 000,00 - 500 000,00 (Hz)	0
119	**Analog End** (final value of the conversion range in Hz)**:** Defines the final frequency, at which the analog output should set its final value of 20 mA.		1 000,00
120	**Analog Gain** (gain of the D/A converter)**:** With a setting of 100, the frequency curve between the parameters „Analog Start“ and „Analog End“ corresponds to the whole stroke of 16 mA (20 mA – 4 mA). With a setting of e. g. 50 the stroke would be only 8 mA and the analog output supplies a value of 4 + 8 = 12 mA when reaching the end frequency of parameter „Analog End“.	1 - 1 000	100
			
121	**Analog Offset** (fine adjustment of the zero point in µA)**:** Accurate adjustment of the analog offset within a fine range.	-25 … +25 (µA)	0
122	*Reserved*		

2.11. OPU Menu

(Operational Unit Menu in case of a connected SMCB.1 display)

No	Parameter	Range	Default
123	**X Factor 1** (no function for SMC, internal SMCB.1 parameter)	1 - 999 999	1
124	**/ Factor 1** (no function for SMC, internal SMCB.1 parameter)	1 - 999 999	1
125	**+/- Value 1** (no function for SMC, internal SMCB.1 parameter)	-999 999 - 999 999	0
126	**Units 1** (no function for SMC, internal SMCB.1 parameter)	0 - 12	0
127	**Decimal Point 1** (no function for SMC, internal SMCB.1 parameter)	0 - 5	0
128	**X Factor 2** (no function for SMC, internal SMCB.1 parameter)	1 - 999 999	1
129	**/ Factor 2** (no function for SMC, internal SMCB.1 parameter)	1 - 999 999	1
130	**+/- Value 2** (no function for SMC, internal SMCB.1 parameter)	-999 999 - 999 999	0
131	**Units 2** (no function for SMC, internal SMCB.1 parameter)	0 - 12	0
132	**Decimal Point 2** (no function for SMC, internal SMCB.1 parameter)	0 - 5	0
133	*Reserved*		

Hint: The actual SMCB.1 display operating manual describes further details about these parameters.

3. Parameter List

No.	Parameter	Min. Value	Max. Value	Default	Characters	Decimal Places	Serial Code
000	Operational Mode	0	9	0	1	0	A0
001	Sampling Time	1	9999	1	4	3	A1
002	Wait Time	10	9999	100	4	3	A2
003	F1-F2 Selection	0	1	0	1	0	A3
004	Div. Switch %-f	0	99999	10000	5	2	A4
005	Div. %-Value	1	100	10	3	0	A5
006	Div. f-Value	0	9999	3000	4	2	A6
007	Div. Calculation	0	1	0	1	0	A7
008	Div. Filter	0	20	1	2	0	A8
009	Error Simulation	0	2	1	1	0	A9
010	Power-up Delay	1	9999	100	4	3	B0
011	SIN Error	0	1	0	1	0	B1
012	Div. Mode	0	2	0	1	0	B2
013	Div. Inc-Value	0	9999999	0	7	0	J2
014	Filter	0	999	0	3	0	J3
015	A-Edge 2/1	0	1	0	1	0	J4
016	Sensor Overlap	0	2	0	1	0	J5
017	Direction1	0	1	0	1	0	B3
018	Multiplier1	1	10000	1	5	0	B4
019	Divisor1	1	10000	1	5	0	B5
020	Position Drift1	0	100000	0	6	0	B6
021	Phase Err Count1	1	1000	10	4	0	B7
022	Set Frequency1	-50000000	50000000	0	88	2	B8
023	SIN Err Time1	0	99	0	2	0	B9
024	Direction2	0	1	0	1	0	C0
025	Multiplier2	1	10000	1	5	0	C1
026	Divisor2	1	10000	1	5	0	C2
027	Position Drift2	0	100000	0	6	0	C3
028	Phase Err Count2	1	1000	10	4	0	C4
029	Set Frequency2	-50000000	50000000	0	88	2	C5
030	SIN Err Time2	0	99	0	2	0	C6
031	Preselect OUT1.H	-50000000	50000000	100000	88	2	C7
032	Preselect OUT1.L	-50000000	50000000	200000	88	2	C8
033	Preselect OUT1.D	0	9999999	0	7	0	M0
034	Preselect OUT2.H	-50000000	50000000	300000	88	2	C9
035	Preselect OUT2.L	-50000000	50000000	400000	88	2	D0
036	Preselect OUT2.D	0	9999999	0	7	0	M1
037	Preselect OUT3.H	-50000000	50000000	500000	88	2	D1
038	Preselect OUT3.L	-50000000	50000000	600000	88	2	D2
039	Preselect OUT3.D	0	9999999	0	7	0	M2
040	Preselect OUT4.H	-50000000	50000000	700000	88	2	D3
041	Preselect OUT4.L	-50000000	50000000	800000	88	2	D4
042	Preselect OUT4.D	0	9999999	0	7	0	M3
043	Preselect REL1.H	-50000000	50000000	10000	88	2	D5

Continuation **„Parameter List“:**

N°	Paramètre	Valeur min.	Valeur max.	Défaut	Chiffres	Décimales	Serial Code
044	Preselect REL1.L	-50000000	50000000	20000	88	2	D6
045	Preselect REL1.D	0	9999999	0	7	0	M4
046	Preselect OUT1.F	1	50000000	10000000	8	4	N0
047	Preselect OUT2.F	1	50000000	10000000	8	4	N1
048	Preselect OUT3.F	1	50000000	10000000	8	4	N2
049	Preselect OUT4.F	1	50000000	10000000	8	4	N3
050	Preselect REL1.F	1	50000000	10000000	8	4	N4
051	*Reserved*	0	10000	1000	5	0	D8
052	Switch Mode OUT1	0	22	0	1	0	D9
053	Switch Mode OUT2	0	22	0	1	0	E0
054	Switch Mode OUT3	0	22	0	1	0	E1
055	Switch Mode OUT4	0	22	0	1	0	E2
056	Switch Mode REL1	0	22	0	1	0	E3
057	Pulse Time OUT1	0	9999	0	4	3	E4
058	Pulse Time OUT2	0	9999	0	4	3	E5
059	Pulse Time OUT3	0	9999	0	4	3	E6
060	Pulse Time OUT4	0	9999	0	4	3	E7
061	Pulse Time REL1	0	9999	0	4	3	E8
062	Hysteresis OUT1	0	1000	0	4	1	E9
063	Hysteresis OUT2	0	1000	0	4	1	F0
064	Hysteresis OUT3	0	1000	0	4	1	F1
065	Hysteresis OUT4	0	1000	0	4	1	F2
066	Hysteresis REL1	0	1000	0	4	1	F3
067	Matrix OUT 1	0	511	0	3	0	K0
068	Matrix OUT 2	0	511	0	3	0	K1
069	Matrix OUT 3	0	511	0	3	0	K2
070	Matrix OUT 4	0	511	0	3	0	K3
071	Matrix REL1	0	511	0	3	0	K4
072	MIA-Delay OUT1	0	99999	0	5	0	K5
073	MIA-Delay OUT 2	0	99999	0	5	0	K6
074	MIA-Delay OUT 3	0	99999	0	5	0	K7
075	MIA-Delay OUT 4	0	99999	0	5	0	K8
076	MIA-Delay REL1	0	99999	0	5	0	K9
077	MAI-Delay OUT 1	0	99999	0	5	0	L0
078	MAI-Delay OUT 2	0	99999	0	5	0	L1
079	MAI-Delay OUT 3	0	99999	0	5	0	L2
080	MAI-Delay OUT 4	0	99999	0	5	0	L3
081	MAI-Delay REL1	0	99999	0	5	0	L4
082	Delay OUT1	0	9999	0	4	3	N5
083	Delay OUT2	0	9999	0	4	3	N6
084	Delay OUT3	0	9999	0	4	3	N7
085	Delay OUT4	0	9999	0	4	3	N8
086	Delay REL1	0	9999	0	4	3	N9
087	Startup Mode	0	9	0	1	0	F4
088	Startup Output	0	31	0	2	0	F5
089	Standstill Time	0	9999	0	4	3	F6
090	Lock Output	0	63	0	2	0	F7
091	Action Output	0	31	0	2	0	F8
092	Action Polarity	0	511	0	3	0	F9
093	Read Back OUT	0	31	0	2	0	G0

094	Output Mode	0	15	0	2	0	G1
095	*Reserved*	0	10000	1000	5	0	H2
096	*Reserved*	0	10000	1000	5	0	H3
097	*Reserved*	0	10000	1000	5	0	H4
098	*Reserved*	0	10000	1000	5	0	J0
099	*Reserved*	0	10000	1000	5	0	J1
100	IN1 Function	0	22	0	2	0	G2
101	IN1 Config	0	35	0	2	0	G3
102	/IN1 Function	0	22	0	2	0	I0
103	/IN1Config	0	35	0	2	0	I1
104	IN2 Function	0	22	0	2	0	G4
105	IN2 Config	0	35	0	2	0	G5
106	/IN2 Function	0	22	0	2	0	I2
107	/IN2 Config	0	35	0	2	0	I3
108	Input Mode	0	2	0	1	0	I4
109	Read Back Delay	0	1000	0	4	3	G6
110	GPI Err Time	1	999	10	3	0	G7
111	Serial Unit Nr.	11	99	11	2	0	90
112	Serial Baud Rate	0	10	0	2	0	91
113	Serial Format	0	9	0	1	0	92
114	Serial Page	0	16	0	2	0	~0
115	Serial Init	0	1	0	1	0	9~
116	*Reserved*	0	10000	1000	5	0	H0
117	RS Selector	0	1	0	1	0	H1
118	Analog Start	-50000000	50000000	0	88	2	H5
119	Analog End	-50000000	50000000	1000000	88	2	H6
120	Analog Gain	1	1000	100	4	0	H7
121	Analog Offset	-25	25	0	83	0	H8
122	*Reserved*	0	10000	1000	5	0	H9
123	X Factor 1	1	999999	1	6	0	z0
124	/ Factor 1	1	999999	1	6	0	z1
125	+/- Value 1	-999999	999999	0	86	0	z2
126	Units 1	0	12	0	2	0	z3
127	Decimal Point 1	0	5	0	1	0	z4
128	X Factor 2	1	999999	1	6	0	z5
129	/ Factor 2	1	999999	1	6	0	z6
130	+/- Value 2	-999999	999999	0	86	0	z7
131	Units 2	0	12	0	2	0	z8
132	Decimal Point 2	0	5	0	1	0	z9
133	*Reserved*	0	10000	1000	5	0	00

Kübler Group
Fritz Kübler GmbH
Schubertstraße 47
D-78054 Villingen-Schwenningen
Deutschland
Tel: +49 7720 3903-0
Fax: +49 7720 21564
info@kuebler.com
www.kuebler.com