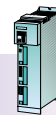


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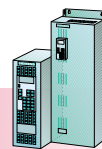
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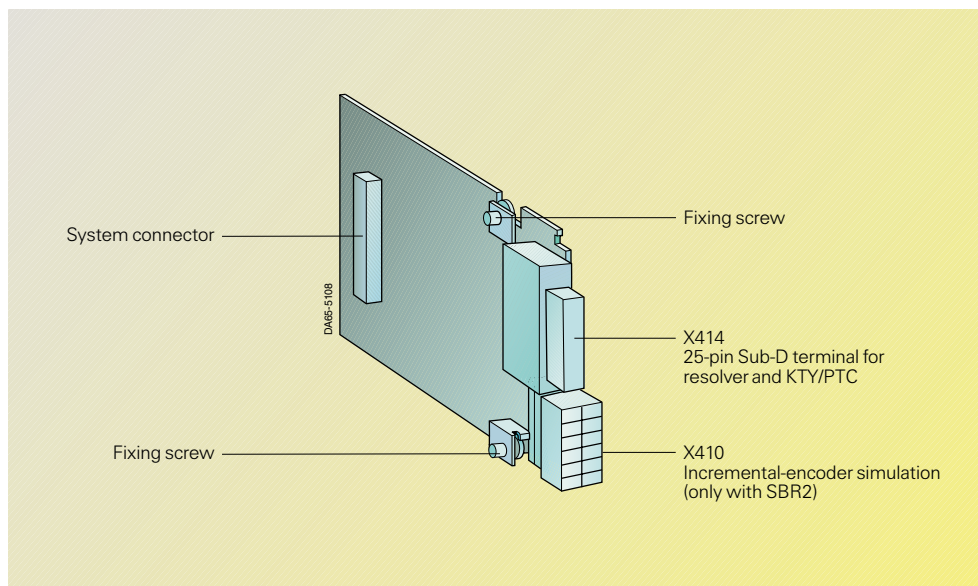


SBR option board for resolvers

The SBR option board (Sensor Board Resolver) enables a resolver to be connected to the converter/inverter modules.

The SBR option board is available in two versions:

- SBR1 Option board for connecting a resolver
- SBR2 Option board for connecting a resolver with additional incremental-encoder simulation.



View of the SBR option board

Connectable resolvers

All standard available 2-pole resolvers and resolvers with the same number of pole pairs as the motor can be connected to the option board. Adaptation to the different types takes place on the option board by means of automatic adaptation of the signal amplitude and of the sampling time.

Temperature sensor

In addition to a resolver, a temperature sensor (KTY or PTC sensor) for monitoring the motor temperature can be connected to the option board.

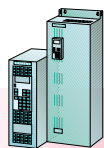
Incremental-encoder simulation

The SBR2 option board is equipped with an incremental-encoder simulator. It provides the signals, A+, A-, B+, B-, Zero+ and Zero- with TTL level which are available via an additional connector on the front of the board.

Terminals

The option board has the following terminals for signal cables:

- X414: Encoder connection via a 25-pole Sub-D male connector
- X410: Incremental-encoder simulator via 6-pin terminal strip (SBR2 only)



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X414 – Encoder terminal

The resolver is connected via a 25-pin Sub-D socket on the front of the option board.

Maximum connectable encoder-cable length with compliant screening: 150 m (492 ft).

Pin	Description	Range
3	Resolver output voltage sin +	–
4	Resolver output voltage sin –	–
5	Internal screen for 3 and 4	–
6	Resolver output voltage cos +	–
7	Resolver output voltage cos –	–
8	Internal screen for 6 and 7	–
9	Resolver excitation V_{SS}	0 V to 7 V
11	Ground for resolver excitation	Automatic adaptation, 5 kHz to 10 kHz sine
13	Motor-temperature monitoring, PTC/KTY	–
24	Internal screen for 13 and 25	–
25	Motor-temperature monitoring PTC/KTY	–
Housing	Equipment grounding conductor	–

X410 – Incremental-encoder simulation (SBR2 board)

The incremental-encoder simulation signals generated on the option board can be detected at terminal X410.

The option board generates 1024 pulses per resolver pole-pair. Correspondingly, with a two-pole resolver, 512 or 1024 pulses are generated. With a four-pole resolver, 1024 or 2048 pulses are generated and, with a six-pole resolver, 1536 or 3072 pulses.

The simulation signals are available as differential signals with a 5 V TTL level.

Maximum encoder-cable length that can be connected with compliant screening: 25 m (82 ft).

Pin	Designation	Description	Range
90	A+	Incremental-encoder simulation, A+ track	5 V TTL level RS422 (standard)
91	A–	Incremental-encoder simulation, A– track	
92	B+	Incremental-encoder simulation, B+ track	5V TTL level RS422 (standard)
93	B–	Incremental-encoder simulation, B– track	
94	N+	Incremental-encoder simulation, Zero+ track	5V TTL level RS422 (standard)
95	N–	Incremental-encoder simulation, Zero– track	

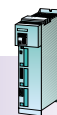
Max. connectable cross-section: 0.14 – 0.5 mm² (AWG 20)

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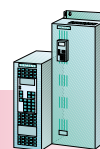
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SBP option board for incremental encoders

The SBP option board (Sensor Board Pulse) enables connection of an incremental encoder or a frequency generator to the converter and inverter for setting the frequency or speed setpoint for SIMOVERT MASTERDRIVES.

Connectable incremental encoders and frequency generators

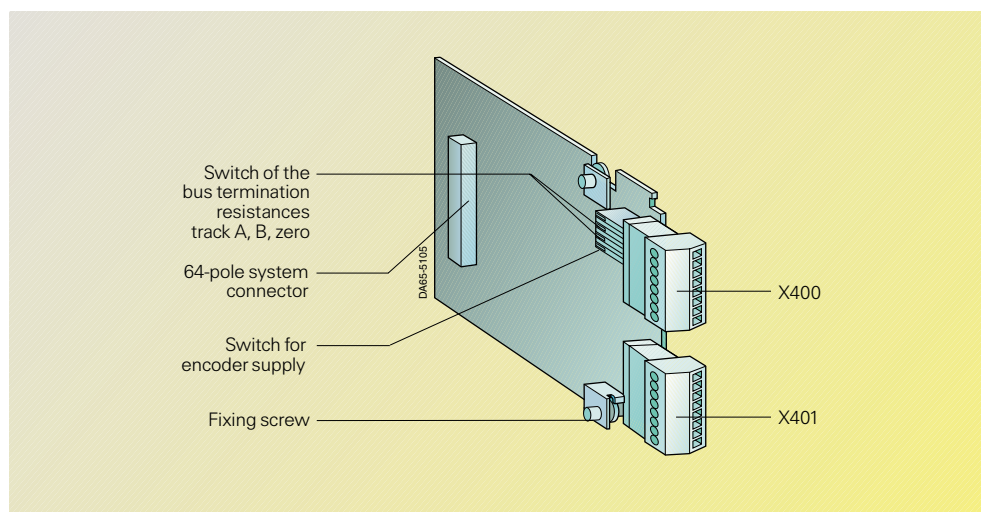
The SBP option board can also be used to evaluate an external encoder or frequency generator.

All standard available incremental encoders can be connected to the option board.

The pulses can be processed in a bipolar or in a unipolar manner as a TTL or HTL level.

The following maximum pulse frequencies apply:

- 410 kHz for evaluation of encoder signals
- 1 MHz for frequency generators



View of the SBP option board

Monitoring by evaluation of the control track is also possible.

The supply voltage of the connected encoder or frequency generator can be set to 5 V or 15 V.

Temperature monitoring

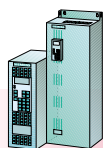
In addition to an incremental encoder, a temperature sensor (KTY or PTC sensor) can be connected to the option board to monitor the motor temperature.

Terminals

The option board has two terminal strips for the signal wires.

For information on customized encoder cables for motor fitting encoder and external encoders, refer to Catalog NC Z.

X400				
Terminal	Designation	Description	Range	
60	+V _{SS}	Power supply for incremental encoder	5 V/15 V	$I_{\text{max.}} = 250 \text{ mA}$
61	−V _{SS}	Ground for power supply	–	
62	−temp	Minus(-) terminal KTY84/PTC100	–	
63	+temp	Plus(+) terminal KTY84/PTC 100	3 mA	Accuracy ±1 %
64	Ground coarse/fine	Ground	–	
65	Coarse pulse 1	Digital input for coarse pulse 1	–	
66	Coarse pulse 2	Digital input for coarse pulse 2	–	
67	Fine pulse 2	Digital input for fine pulse 2	–	
Max. connectable cross-section: 0.14 – 1.5 mm² (AWG 16)				
Terminal 60 is at the top when installed.				



Compact and chassis units



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X401	Terminal	Designation	Description	Range
	68	A+ track	Plus(+) terminal Track A	TTL/HTL/HTL, unipolar
	69	A- track	Minus(-) terminal Track A	TTL/HTL/HTL, unipolar
	70	B+ track	Plus(+) terminal Track B	TTL/HTL/HTL, unipolar
	71	B- track	Minus(-) terminal Track B	TTL/HTL/HTL, unipolar
	72	Zero pulse +	Plus(+) terminal Zero track	TTL/HTL/HTL, unipolar
	73	Zero pulse -	Minus(-) terminal Zero track	TTL/HTL/HTL, unipolar
	74	CTRL +	Plus(+) terminal Control track	TTL/HTL/HTL, unipolar
	75	CTRL - = M	Minus(-) terminal Control track = Ground	TTL/HTL/HTL, unipolar

Max. connectable cross-section: 0.14 – 1.5 mm² (AWG 16)
Terminal 68 is at the top when installed.

Voltage range of the encoder inputs		RS422 (TTL)	HTL bipolar	HTL unipolar
<p>Note</p> <p>If unipolar signals are connected, one ground terminal for all signals at the CTRL- terminal is sufficient. Due to possible interference emission, it is recommended for cable lengths over 50 m (164 ft) that the four terminals A-, B-, zero pulse - and CTRL- be bypassed and connected to the encoder ground.</p>	Voltage range - Input	Max. 33 V; min. -33 V		
	Voltage range + Input	Max. 33 V; min. -33 V		
	Switching level of differential voltage - LOW	Min. -150 mV	Min. -2 V	Min. 4 V
	Switching level of differential voltage - HIGH	Max. 150 mV	Max. 2 V	Max. 8 V

Voltage range of the digital inputs		Rated value	Min.	Max.
<p>Note</p> <p>The inputs are non-floating. The rough pulse is smoothed with 0.7 ms, the fine pulse with approx. 200 ns.</p>	Voltage range LOW	0 V	-0.6 V	3 V
	Voltage range HIGH	24 V	13 V	33 V
	Input current LOW	≤ 2 mA		
	Input current HIGH	10 mA	8 mA	12 mA

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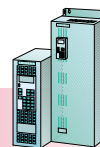
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Compact PLUS units



Compact and chassis units



SBM/SBM2 option board for incremental encoder/absolute-value encoder

The SBM/SBM2 board (Sensor Board Multiturn/sin/cos incremental encoder 1 V_{pp}) enables connection and evaluation of sin/cos incremental and multiturn encoders.

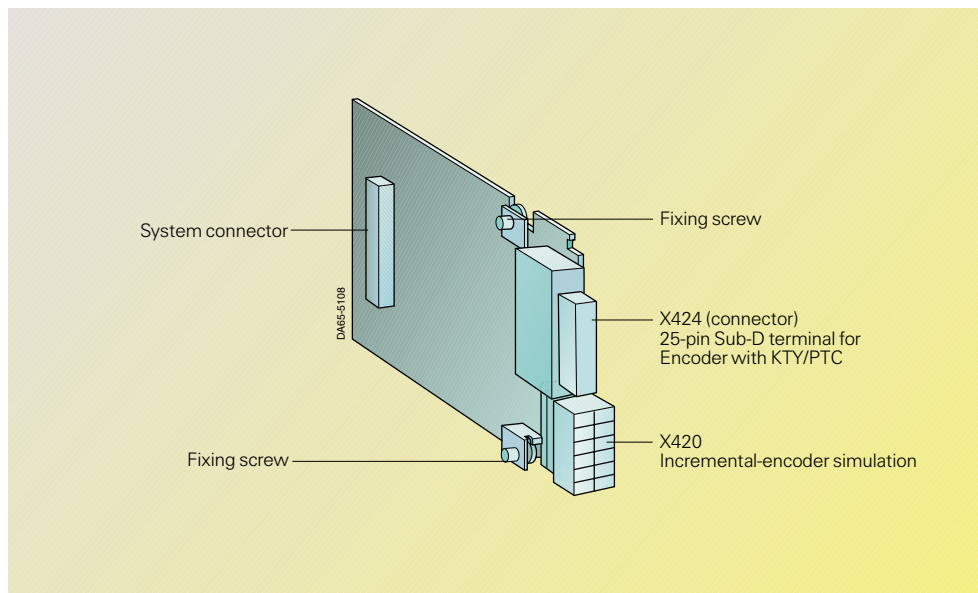
Incremental encoders with 4 to 16384 lines per revolution are supported.

For the multiturn phase-angle encoder, the usual communication protocols are supported (EnDat and SSI) with baud rates from 100 kHz to 2 MHz.

The supply voltage for the encoders can be set to 5 V, 7.5 V or 15 V. By connecting the sense cable, the voltage of long encoder cables can be monitored and corrected at the encoder input (4-wire principle).

Extended functionality of the SBM2

- Adjustment of the encoder voltage supply by means of software parameter P145
- High resolution (approx. $17 \cdot 10^6$ increments per revolution) possible also for external encoders.



View of the SBM2 option board

In addition to the processing of encoder signals, the motor temperature is also detected (either KTY or PTC sensors).

The A+, A-, B+, B-, zero+ and zero- signals are provided by the incremental-encoder simulator via an additional connector on the front of the board using the

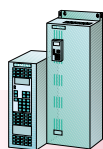
RS422 standard. The number of pulses/revolutions corresponds to the number of lines of the incremental encoder or multiturn encoder.

Note

The SBM2 is supported from Version 1.3 of the Motion Control firmware upwards!

For information on customized encoder cables for motor fitting encoder and external encoders, see Catalog NC Z.

X424 – Incremental encoder terminal	Pin	Designation	Description
Maximum connectable encoder-cable length with compliant screening: 100 m (328 ft).	1	P incremental encoder	5 V/7.5 V/15 V switchable, $I_{\max} = 390$ mA
	2	M incremental encoder	Ground
	3	A+	$V_{SS} = 1$ V
	4	A-	(0.8 V to 1.2 V)
	5	Internal screen	
	6	B+	$V_{SS} = 1$ V
	7	B-	(0.8 V to 1.2 V)
	8	Internal screen	
	13	+temp	Motor-temperature monitoring PTC/KTY
	14	5 V sense	Sensor input for 5 V voltage control
	16	0 V sense	Reference for Pin 14
	17	R+	Zero track $V_{SS} = 0.5$ V
	18	R-	(0.2 V – 0.8 V)
	19	C+	1 sine/revolution $V_{SS} = 1$ V
	20	C-	(0.8 V – 1.2 V)
	21	D+	1 cosine/revolution $V_{SS} = 1$ V
	22	D-	(0.8 V – 1.2 V)
	24	Internal screen	
	25	-temp	Motor-temperature monitoring PTC/KTY
	Housing	External screen	



Compact and
chassis units



Compact
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X424 – Terminal for absolute-value multiturn encoder		Pin	Designation	Description
Maximum connectable encoder-cable length with compliant screening: 100 m (328 ft).		1	P incremental encoder	5 V/7.5 V/15 V switchable, $I_{\max} = 390 \text{ mA}$
		2	M incremental encoder	Ground
		3	A+	$V_{SS} = 1 \text{ V}$
		4	A–	(0.8 V – 1.2 V)
		5	Internal screen	–
		6	B+	$V_{SS} = 1 \text{ V}$
		7	B–	(0.8 V – 1.2 V)
		8	Internal screen	–
		10	Pulse +	Baud rate 100 kHz to 2 MHz
		12	Pulse–	RS422
		13	+temp	Motor-temperature monitoring PTC/KTY
		14	5 V sense	Sensor input for 5 V voltage control
		15	Data +	RS485
		16	0 V Sense	Ground, sensor input
		23	Data–	RS485
		24	Internal screen	–
		25	–temp	Motor-temperature monitoring PTC/KTY
		Housing	External screen	–

X420 – Incremental-encoder simulation		Terminal	Designation	Description	Range
Maximum connectable encoder-cable length with compliant screening: 25 m (82 ft).		80	A+	Incremental-encoder simulation, track A+	RS422 standard
		81	A–	Incremental-encoder simulation, track A–	
		82	B+	Incremental-encoder simulation, track B+	RS422 standard
		83	B–	Incremental-encoder simulation, track B–	
		84	N+	Incremental-encoder simulation, track zero+	RS422 standard
		85	N–	Incremental-encoder simulation, track zero–	

Max. connectable cross-section: 0.14 – 0.5 mm² (AWG 20)

At terminal X420, the signals of the incremental-encoder simulator, which are generated on the option board, can be picked up.

A non-existing zero pulse (if a multiturn encoder is connected) is simulated by the board.

The simulation signals are available as differential signals in accordance with the RS422 standard.