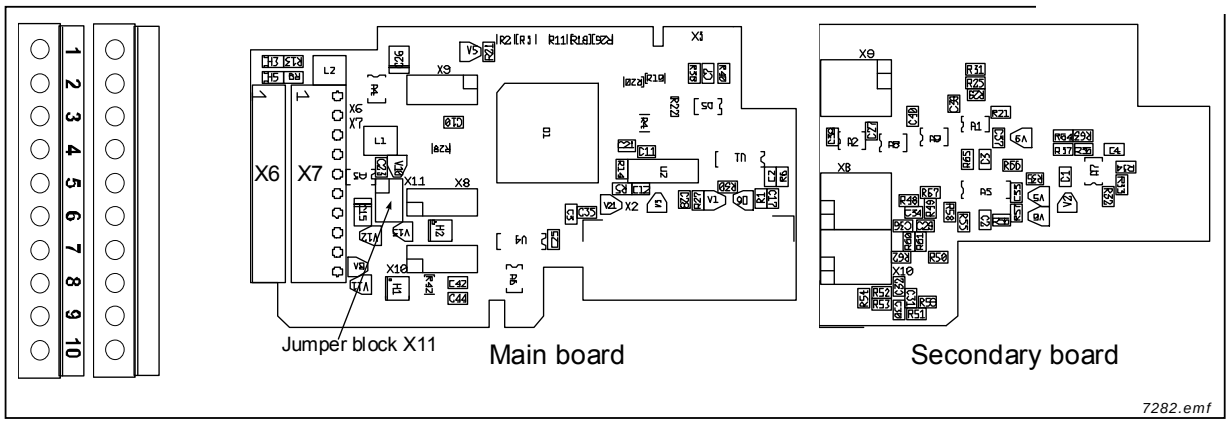
depending on the slot which the expander board is plugged into. See chapter 1.7.

3.2.7 OPTBB



Description:	Absolute encoder board for VACON® NXP with inputs for an Endat type encoder. Programmable control voltage, fast digital inputs and simulation pulse output. The output pulse is produced from sinusoidal input signals. The galvanically isolated fast digital inputs are used to trace very short pulses.
Allowed slots:	C
Type ID:	16962 (main board), 16963 (secondary board); The secondary board is mounted on top of the main board
Terminals:	Two terminal blocks; Screw terminals (M2.6); No coding
Jumpers:	1; X11 (see page 66)
Board parameters:	Yes (see page 67)

An absolute encoder is a type of encoder capable of specifying its absolute position. The position data is retained even during a power failure or breakdown. The position data carried by the absolute encoder can be used by the AC drive motor control in the control of a synchronous motor.

Encoder cable	Heidenhain cable; Max. length 100m
Encoder voltage	5V, 12V or 15V Max. current consumption 300mA
Measuring steps/ revolution	4.2 billion (max. 32bit)
Distiguishable revolutions	0—65535 (max. 16bit)
Signal periods/revolution	1—65535

ENDAT is a bidirectional synchronic serial interface for absolute encoders. For example, the encoder position data can be read and encoder parameters can be set via the ENDAT connection. It also forwards the messages related to the encoder functions.

All Endat connections are available in terminal X6. The board uses Endat version 2.

Sinus signals require some precautions for noise immunity that may be a little more demanding than conventional square wave encoders. Use of twisted pairs (possibly with individual shielding of each pair) is recommended. Use one pair for sinus+ and sinus-, another pair for cosinus+ and cosinus-, another pair for data+ data- of the absolute serial channel, another pair for clock+ and clock- of absolute channel.

I/O terminals on OPTBB, encoder terminal X6

Table 31. I/O terminals on OPTBB, terminal X6

Terminal		Heidenheim colour code	Technical data
1	DATA+	Grey	Data line 120Ω/RS-485
2	DATA–	Pink	
3	CLOCK+	Violet	Clock line 120Ω/RS-485 (200—400kHz)
4	CLOCK–	Yellow	
5	A+	Green/black	1Vpp (±0.5V); impedance 120Ω; Max.input 350 kHz
6	A–	Yellow/black	
7	B+	Blue/black	1Vpp (±0.5V); impedance 120Ω; Max.input 350 kHz
8	B–	Red/black	
9	GND	White/green	Input ground
10	Encoder voltage	Brown/green	Selectable encoder voltages: 5V, 12V and 15V Max.current consumption 300mA

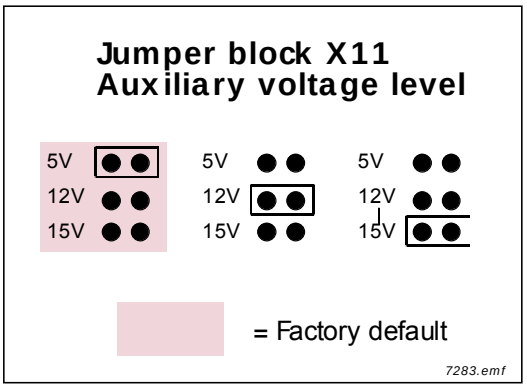
I/O terminals on OPTBB, terminal X7

Table 32. I/O terminals on OPTBB, terminal X7

Terminal		Technical data
1	SimA+	Incremental pulse output A (differential), 0° (square wave, signal level RS-422); Impedance 120Ω; Input hysteresis ±5mV
2	SimA–	
3	SimB+	Incremental pulse output B (differential), 0° (square wave, signal level RS-422); Impedance 120Ω; Input hysteresis ±5mV
4	SimB–	
5	Not used	
6	Not used	
7	FDIN1	Fast digital input 1; HTL; Min.pulse length 50µs
8	CMA	Common FDIN1
9	FDIN2	Fast digital input 2; HTL; Min.pulse length 50µs
10	CMB	Common FDIN2

Jumper selections

On the OPTBB board, there is one jumper block used to program the control voltage (auxiliary voltage). The factory default and other available jumper selections are presented below.



NOTE! It is recommended to use a +12 or +15 supply voltage instead of 5 V.

This is because our interface does not support "sense" function to compensate voltage drop which results in a cable length limit of about 60 m with 0.5 mm^2 wire section for the supply. The problem does not exist with 12 or 15 v supply.

If 5V is used, it is recommended to use two or more wires in parallel for supply connection.

OPTBB board parameters

Table 33. OPTBB board parameters

Code	Parameter	Min	Max	Default	Selections	Description
7.3.1.1	Reverse	0	1	0	0 = No 1 = Yes	Manually selectable rotation direction
7.3.1.2	Reading rate	0	4	1	0 = Not used 1 = 1 ms 2 = 5 ms 3 = 10 ms 4 = 50 ms	Incremental pulse reading rate. NOTE: Use value 1 in Closed Loop mode.
7.3.1.3	Interpolation	0	1	0	0 = No 1 = Yes	If activated, the sinusoidal incremental pulses are used to calculate the polar angle in order to optimize the encoder accuracy

OPTBB board monitoring values

Table 34. OPTBB board monitoring values

Code	Monitored value	Unit	Description
7.3.2.1	Encoder frequence	Hz	Motor speed in Hz calculated from encoder pulses
7.3.2.2	Encoder speed	rpm	Motor speed in rpm calculated from encoder pulses
7.3.2.3	Encoder position	-	Absolute position of encoder read from Endat
7.3.2.4	Encoder revolution		
7.3.2.5	Encoder fault		
7.3.2.6	Encoder warning		
7.3.2.7	Encoder messages		Number of messages between encoder and NXOPTBB

OPTBB board information pages

Table 35. OPTBB board information pages

Code	Information	Unit	Description
7.3.3.1	Encoder type		0 = No encoder connected 1—4 = Incremental linear encoder 5 = Linear absolute encoder 6 = Unknown 7 = Linear absolute encoder 8 = Unknown 9—12 = Rotational incremental/angular encoder 13 = Absolute encoder (singleturn) 14 = Unknown 15 = Absolute encoder (multiturn) 16 = Unknown
7.3.3.2	Pulses/Revolution		Sinusoidal pulses/revolution
7.3.3.3	Position bits	bit	Accurate position 1—1024 (10bit = 2^{10} = 1024)
7.3.3.4	Revolution bits	bit	Accurate number of revolutions 1—1024 (10bit = 2^{10} = 1024)

OPTBB option board status LEDs

Yellow LED

LED	Meaning
OFF	Option board not activated
ON	Option board in initialisation state waiting for activation command from the AC drive
Blinking fast (once/sec)	Option board is activated and in RUN state • Option board is ready for external communication
Blinking slow (once/5 s)	Option board is activated and in FAULT state • Internal fault of option board

Green LED

LED	Meaning
OFF	Option board not activated
ON	Encoder is being initialised Option board is reading encoder parameters
Blinking fast (once/s)	Encoder detected by option board Option board receives data from encoder
Blinking slow (once/5 s)	Encoder detected by option board Option board cannot read encoder data or data is invalid (CRC error, broken cable etc.)