3.1.6   OPTA7

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Jumper X4

Jumper X5   Jumpers X15 and X16

7258.emf
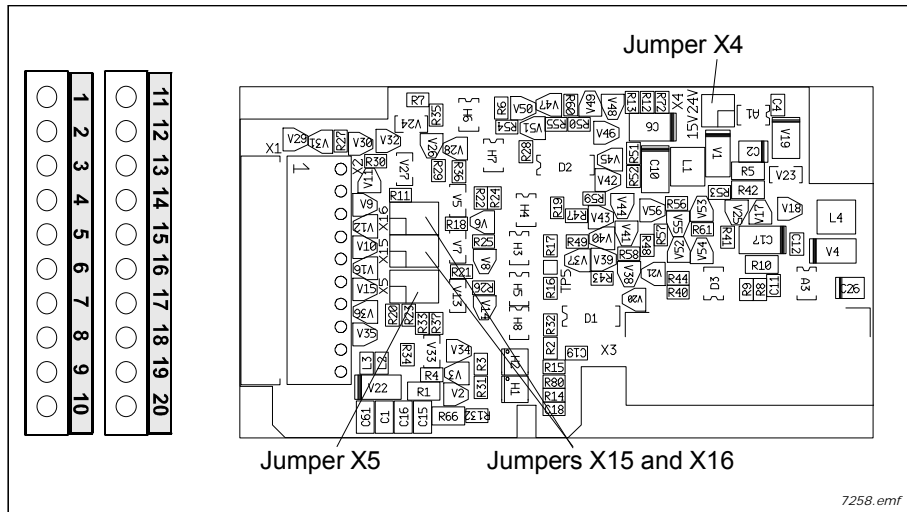
Description:	Duplicate encoder board for VACON® NXP. Encoder input board with programmable control voltage for the encoder.
	The OPTA7 board is designed for HTL (High voltage Transistor Logic) type encoders (voltage output type push-pull HTL, open collector output type HTL) which provide input signal levels dependent on the supply voltage of the encoder. The encoder inputs A, B and Z are galvanically isolated. The OPTA7 board includes, too, the qualifier inputs ENC1Q and ENC2Q meant to trace positions in positioning applications.
	The board can be used as both Master and Slave device. The encoder input signal is repeated on the board and carried to the next device through the digital output.
Allowed slots:	C
Type ID:	16695
Terminals:	Two terminal blocks; Screw terminals (M2.6); Coding in terminals #3 and #14.
Jumpers:	4; X4, X5, X15 and X16 (see page 35)
Board parameters:	Yes, see page 38.

I/O terminals on OPTA7

Table 12. OPTA7 I/O terminals

	Terminal	Parameter reference Keypad/NCDrive	Technical information
1	DIC1A+		Pulse input A (differential); Voltage range 10...24V
2	DIC1A–		
3	DIC2B+		Pulse input B; phase shift of 90 degrees compared to Pulse input A (differential); Voltage range 10...24V
4	DIC2B–		
5	DIC3Z+		Pulse input Z; one pulse per revolution (differential); Voltage range 10...24V
6	DIC3Z–		
7	ENC1Q		Qualifier input. Single-ended input with GND
8	ENC2Q		Qualifier input. Single-ended input with GND
9	GND		Ground for control and inputs ENC1Q and ENC2Q
10	+15V/+24V		Control voltage (auxiliary voltage) output to encoder; Output voltage selectable with jumper X4.
11	DID1A+		Pulse input A (differential input), voltage range 10...24V
12	DID1A–		
13	DID2B+		Pulse input B; 90 degrees phase shift compared to the pulse input A (differential input), voltage range 10...24V
14	DID2B–		
15	DID3Z+		Pulse input Z; one pulse per revolution (differential input), voltage range 10...24V
16	DID3Z–		
17	DOD1A+		Pulse output A (differential), output voltage +24V. Pulse input DIC1A or DID1A is internally repeated in the card and connected to the DOD1A output.
18	DOD1A–		
19	DOD2B+		Pulse output B (differential), output voltage +24V. Pulse input DIC2A or DID2A is internally repeated in the card and connected to the DOD2A output.
20	DOD2B–		

NOTE: Encoder inputs are wide range inputs that can be used with encoders using +15V or +24V.

Technical data:

Encoder control voltage, +15V/+24V	Control voltage selectable with jumper X4.
Encoder input connections, inputs A+, A−, B+, B−, Z+, Z−	Max. input frequency ≤150kHz Inputs A, B and Z are differential
Qualifier input ENC1Q Fast digital input DIC1	Max. input frequency ≤10kHz Min. pulse length 50µs Digital input 24V; R_i>5kΩ Digital input is single-ended; connected to GND

NOTE: A high pulse frequency combined with a great cable capacitance places a considerable load on the encoder. Apply therefore as low a voltage as possible for the encoder supply, rather lower than 24V. The manufacturer also recommends to place jumper X4 to position +15V, if allowed in the voltage range specification of the encoder.

Jumper selections

On the OPTA7 board, there are four jumper blocks.

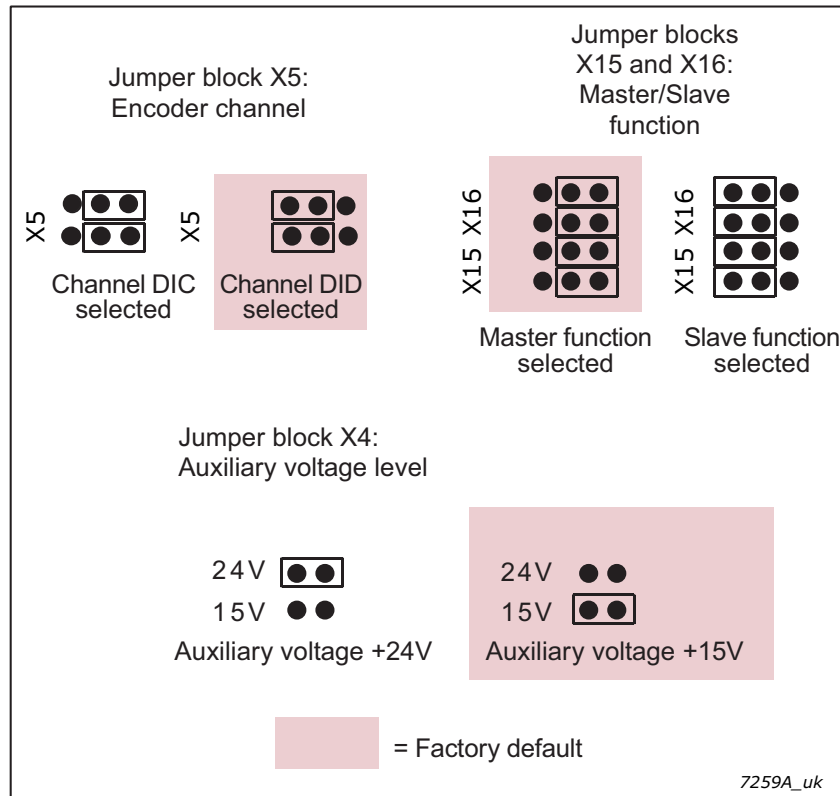Jumper X4 is used to program the control voltage (auxiliary voltage).

The setting of jumper X5 defines the encoder channel (DIC/DID) used to carry the signal to the repeater.

The setting of jumpers X15 and X16 is changed according to whether the board is used as a Master or Slave device.

In Slave function input, signals DID1A are directly connected to outputs DOD1A and signals DID2B are directly connected to outputs DOD2B.

In Master Function input signals DIC_ or DID_, as selected with Jumper Block X5 "Encoder Channel", DIC1A or DID1A are actively connected to outputs DOD1A and DIC2A or DID2A are actively connected to outputs DOD2B.

The factory default and other available jumper selections are presented below.

Jumper block X5:
Encoder channel

Jumper blocks
X15 and X16:
Master/Slave
function

Channel DIC
selected

Channel DID
selected

Master function
selected

Slave function
selected

Jumper block X4:
Auxiliary voltage level

24V
15V
Auxiliary voltage +24V

24V
15V
Auxiliary voltage +15V

= Factory default

7259A_uk

Usage: Closed Loop Vector Control, positioning applications. The OPTA7 encoder board is mainly used in demanding system applications, e.g. when measuring the motor speed with two encoders.

Encoder connection

The figures below present examples of a chain connection of several OPTA7 boards (Figure 17) and a connection of two encoders to the OPTA7 option board (Figure 18).
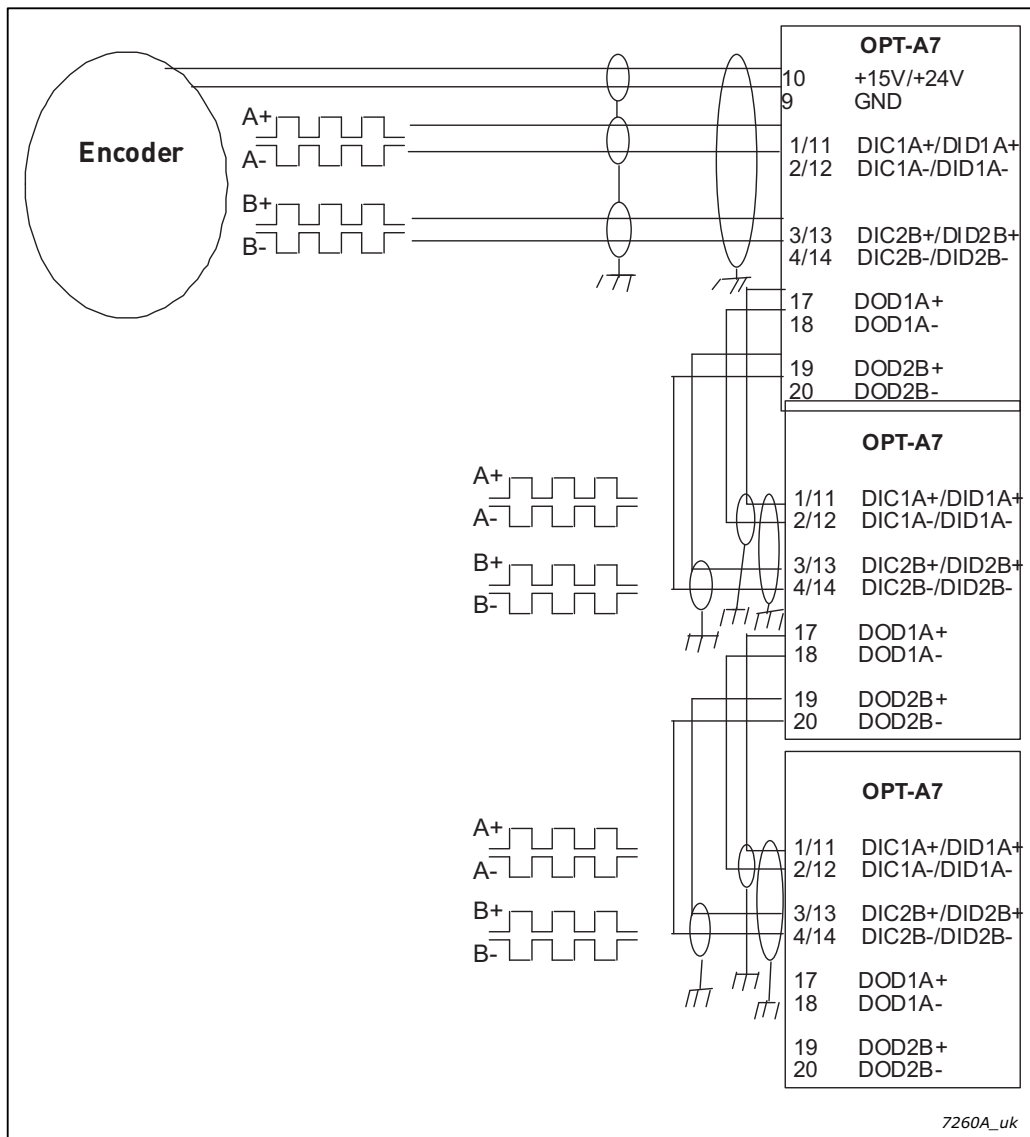

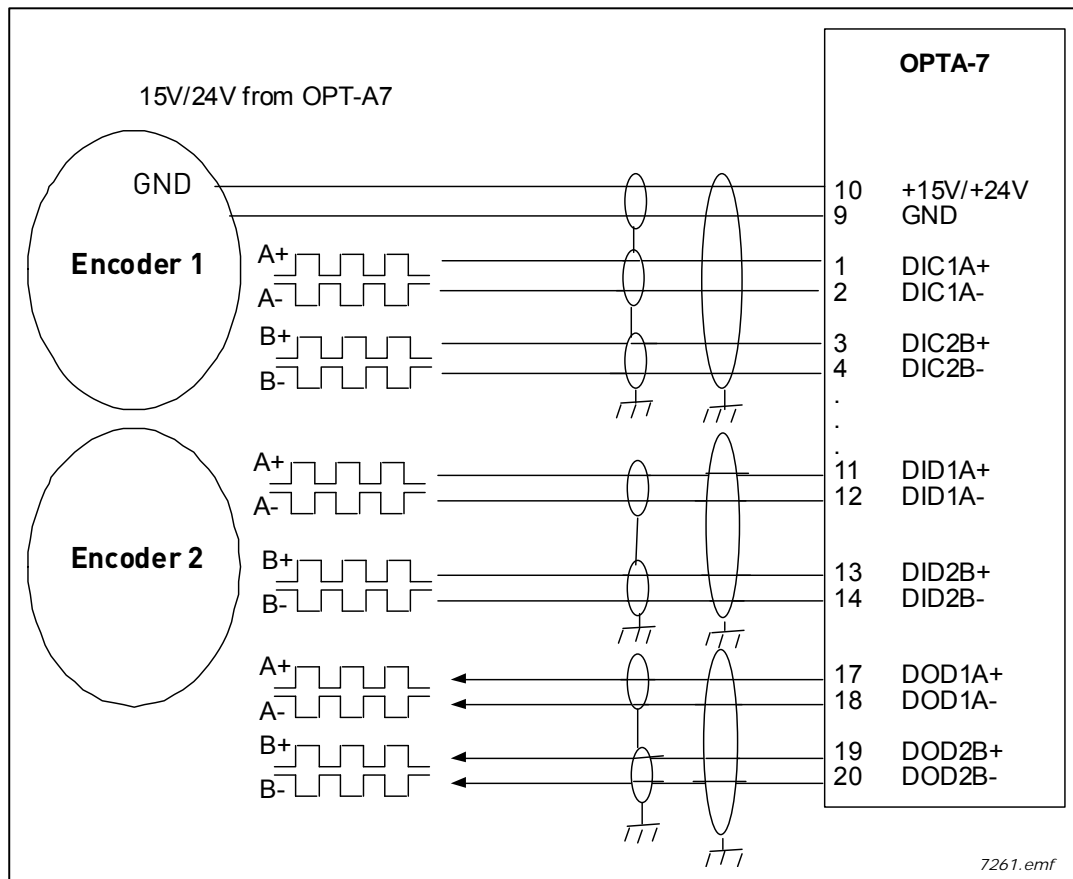*Figure 17. Connection of encoder and three OPTA7 boards*

Figure 18. Connection of two encoders to OPTA7 board

OPTA7 parameters

Table 13. OPTA7 parameters

Number	Parameter	Min	Max	Default	Note
7.3.1.1	Encoder 1 Pulse/revolution	0	65535	1024	
7.3.1.2	Invert encoder 1 direction	0	1	0	0 = No 1 = Yes
7.3.1.3	Reading rate	0	4	1	Time used to calculate speed actual value. **NOTE:** Use value 1 in Closed Loop mode. 0 = No 1 = 1 ms 2 = 5 ms 3 = 10 ms 4 = 50 ms
7.3.1.4	Encoder 2 Pulse/revolution	0	65535	1024	
7.3.1.5	Encoder 2 type	1	3	1	1 = A,B = speed 2 = A = REF, B = DIR 3 = A= FORW, B = REV See page 27 for explanations!

Local contacts: http://drives.danfoss.com/danfoss-drives/local-contacts/

OPTA7 monitoring values

Table 14. OPTA7 monitoring values

Number	Monitored value	Unit	Description
Mon 7.3.2.1	Encoder 1 frequency	Hz	Motor speed in Hz calculated from encoder 1 pulses
Mon 7.3.2.2	Encoder 1 speed	rpm	Motor speed in rpm calculated from encoder 1 pulses
Mon 7.3.2.3	Encoder 2 frequency	Hz	Motor speed in Hz calculated from encoder 2 pulses
Mon 7.3.2.4	Encoder 2 speed	rpm	Motor speed in rpm calculated from encoder 2 pulses