**DRIVE CENTRE** DC
**Industrial Automation Systems Integrators**

57 Galaxy Blvd., Units 1 & 2, Toronto, ON M9W 5P1
TEL: (416) 231-6767
www.drivecentre.ca

### 3.1.4    OPTA4



Jumper X2

Jumper X4

7246.emf
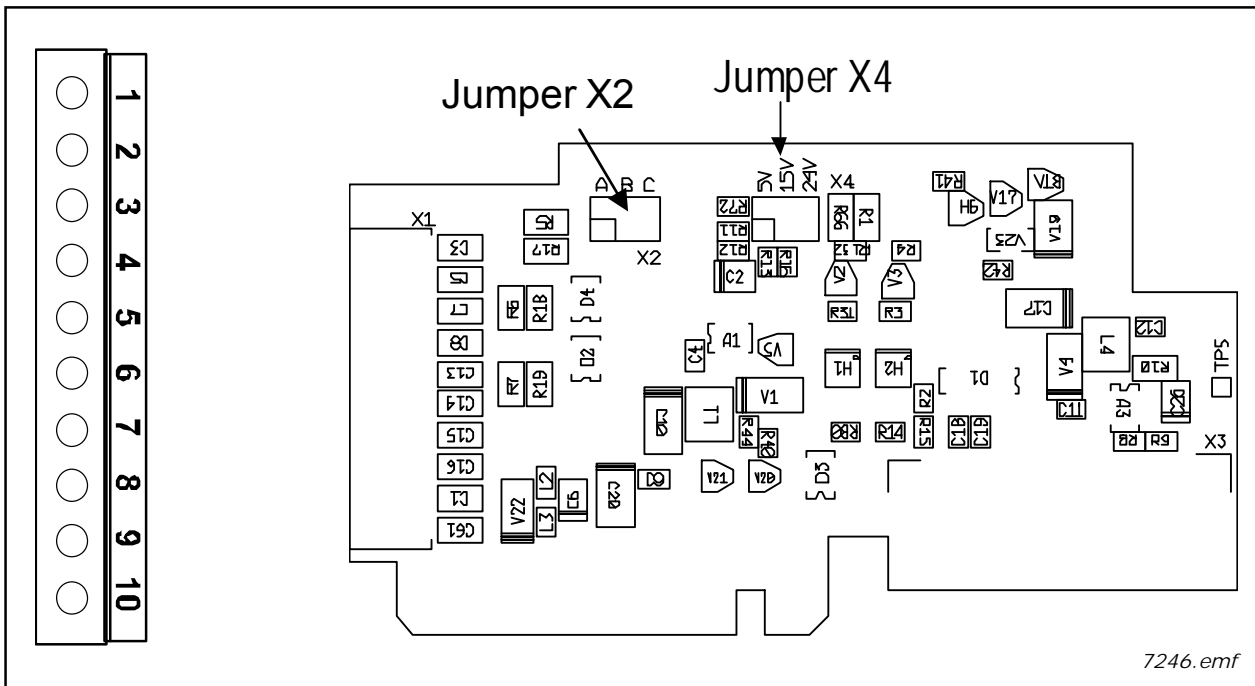
Description:            Encoder board for VACON® NXP. Encoder input board with programmable control voltage for an encoder.

The encoder board OPTA4 is for TTL type encoders (TTL, TTL(R)) providing input signal levels that meet the RS_422 interface standard. Encoder inputs A, B and Z are not galvanically isolated. The OPTA4 board includes, too, the qualifier input ENC1Q (meant to trace the Z-pulse in certain situations) and a special/fast digital input DIC4 (used to trace very short pulses). These two inputs are used in special applications.

The TTL type encoders do not have an internal regulator and use therefore a supply voltage of +5V±5% whereas the TTL(R) type encoders have an internal regulator and the supply voltage can be e.g. +15V±10% (depending on the encoder manufacturer).

Allowed slots:         C
Type ID:               16692
Terminals:             One terminal block; Screw terminals (M2.6); Coding in terminal #3.
Jumpers:               2; X4 and X2 (see page 25)
Board parameters:      Yes (see page 27)

**I/O terminals on OPTA4 (coded terminal painted black)**

*Table 9. OPTA4 I/O terminals*

| | Terminal | Parameter reference Keypad/NCDrive | Technical information |
|---|---|---|---|
| 1 | DIC1A+ | | Pulse input A |
| 2 | DIC1A– | | |
| **3** | DIC2B+ | | Pulse input B; phase shift of 90 degrees compared to Pulse input A |
| 4 | DIC2B– | | |
| 5 | DIC3Z+ | | Pulse input Z; one pulse per revolution |
| 6 | DIC3Z– | | |
| 7 | ENC1Q | | Reserved for future use |
| 8 | DIC4 | | Reserved for future use |
| 9 | GND | | Ground for control and inputs ENC1Q and DIC4 |
| 10 | +5V/+15V/+24V | | Control voltage (auxiliary voltage) output to encoder; Output voltage selectable with jumper X4. See chapter 1.4.4. |

**Technical data:**

| | |
|---|---|
| Encoder control voltage, +5V/+15V/+24V | Control voltage selectable with jumper X4. |
| Encoder input connections, inputs A+, A−, B+, B−, Z+, Z− | Max. input frequency ≤150kHz<br>Inputs A, B and Z are differential<br>Encoder inputs are RS-422 interface compatible<br>Max. load per encoder input $I_{low} = I_{high} \approx 25mA$ |
| Qualifier input ENC1Q<br><br>Fast digital input DIC4 | Max. input frequency ≤10kHz<br>Min. pulse length 50µs<br>Digital input 24V; $R_i > 5k\Omega$<br>Digital input is single-ended; connected to GND |

**Jumper selections**

On the OPTA4 board, there are two jumper blocks. The jumper X2 is used to define the status of the termination resistor (R=135Ω). The jumper X4 is used to program the control voltage (auxiliary voltage). The factory default and other available jumper selections are presented below.
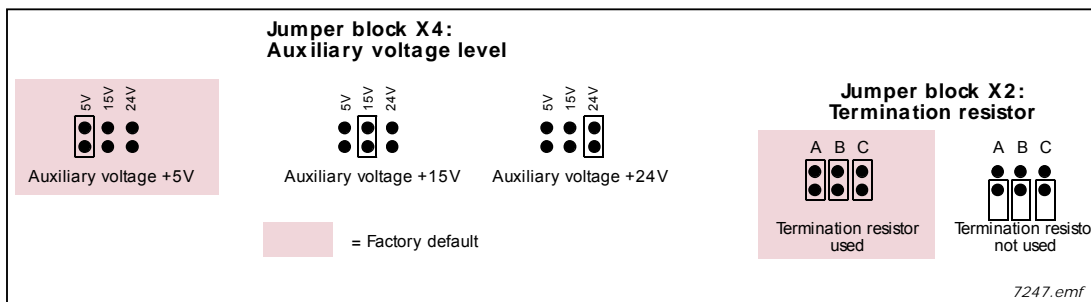


**NOTE:** If one encoder is connected to one drive only, the termination resistor on the board must be used. If the encoder is connected to several drives, the termination resistor of the last drive must be used.
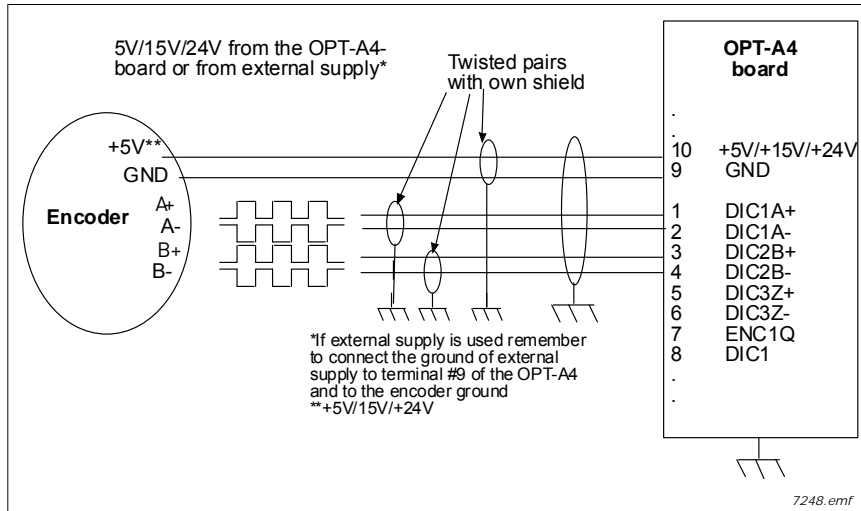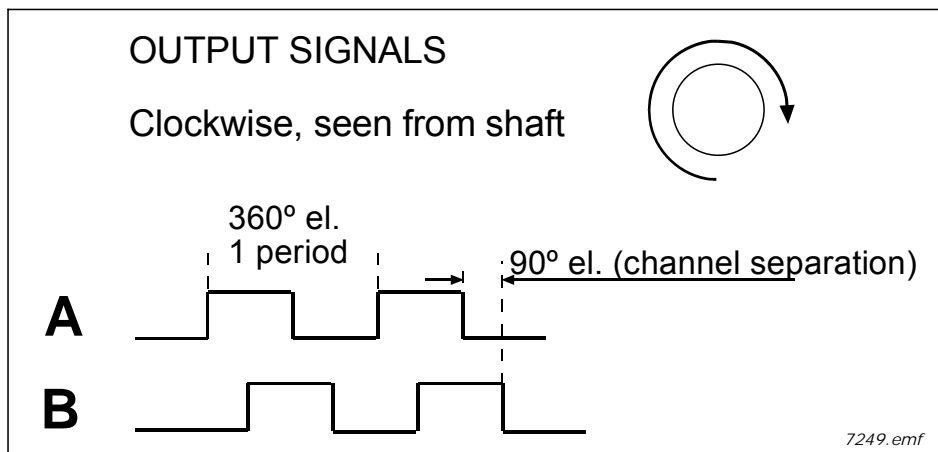
**Encoder connection – Differential**



*Figure 13. RS-422 type encoder connection using differential inputs*

**NOTE:**

The encoder pulses are handled by VACON® software as presented below:

### OPTA4 parameters

*Table 10. OPTA4 board-related parameters*

| Number | Parameter | Min | Max | Default | Note |
|--------|-----------|-----|-----|---------|------|
| 7.3.1.1 | Pulse/revolution | 1 | 65535 | 1024 | |
| 7.3.1.2 | Invert direction | 0 | 1 | 0 | 0 = No<br>1 = Yes |
| 7.3.1.3 | Reading rate | 0 | 4 | 1 | Time used to calculate speed actual value.<br>NOTE: Use value 1 in Closed Loop mode.<br>0 = No<br>1 = 1 ms<br>2 = 5 ms<br>3 = 10 ms<br>4 = 50 ms |
| 7.3.1.4 | Encoder type | 1 | 3 | 1 | 1 = A,B = speed<br>2 = A = REF, B = DIR<br>3 = A= FORW, B = REV |

### Par 7.3.1.4    Encoder Type (can be selected with boards A4, A5 and A7 (encoder 2 mode))

1 = A, B = Speed

Only with this input type it is possible to use Closed Loop speed control in an NXP drive.  NXS drives do not have Closed Loop possibility, but encoder signal can be used e.g. for reference or positioning.
This input mode requires that both channels A and B are receiving pulses, differential connection is recommended.
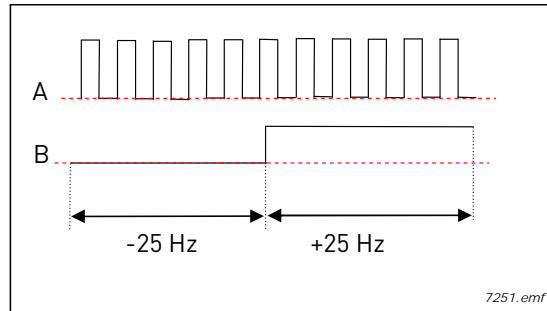
Direction of speed is determined from 90° difference in signals.
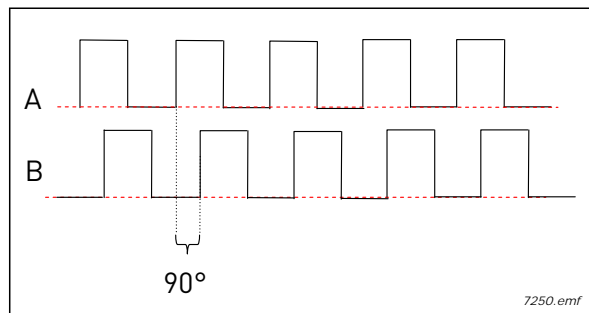


2 = A = Ref,  B = Dir

This type cannot be used for Closed Loop control!
In this mode only channel A is receiving pulses. Channel B will determine if direction is negative or positive.  Input in channel B must be static signal.

3 = A = Forw, B = Rev

This type cannot be used for Closed Loop control!
In this mode both channels are receiving signal but not at the same time.
Pulses on channel A means positive direction.
Pulses on channel B means negative direction.