emotron®

DEDICATED DRIVE

I/O board 2.0
Option

Instruction Manual - English

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Safety

Instruction manual

Read this instruction manual first!

Since this option is a supplementary part of the variable speed drive, the user must be acquainted with the original instruction manual of the main product. All safety instructions, warnings, etc. as mentioned in this instruction manual are to be known to the user.

Safety instructions

Read the safety instructions in the instruction manual for the product.

Installation

Installation, commissioning, dismounting, making measurements, etc. of or on the main product may only be carried out by personnel who are technically qualified for the task. Installation must also be carried out in accordance with the local standards. Ensure that all necessary safety measures are taken.

WARNING: Take all necessary safety precautions during installation and commissioning to prevent personal injuries, e.g. by an uncontrolled load.

Opening the variable speed drive

WARNING: Always switch off the mains supply before opening the variable speed drive and wait at least 5 minutes to allow the buffer capacitors to discharge.

Always take adequate precautions before opening the variable speed drive, even though the connections for the control signals and jumpers are isolated from the mains voltage.

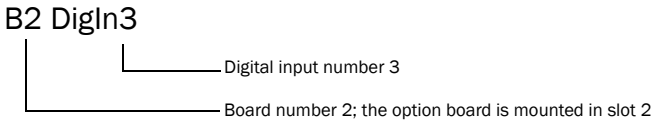
Contents

1 Introduction

The I/O board is an option board for variable speed drives (VSD). Further on in this manual we refer to the main product. The I/O board offers three additional galvanic isolated digital inputs and three additional and programmable relay outputs. The digital inputs and relay outputs are named as follows.

Bx DigInx or Relayx, where B stands for option board and DigIn for digital input. X can be 1, 2 or 3. The board number is 1 if the option board is mounted on the slot marked 1 on the mounting plate.

Example



After the I/O board is installed, the software automatically detects the presence of the board and the related menus will subsequently appear and become active in the Setup Menu of the VSD.

1.1 Description

This instruction manual describes the installation and use of the I/O board option which can be built into the following types of variable speed drives:

FDU 2.0

VFX 2.0

Delivery and unpacking

Check the delivery. The shipment should contain:

- I/O board
- Mounting material as described in the Installation chapter.
- This manual

Check for visible signs of damage. Do not install if damage is found. If damage is found or something is missing from the package, please contact your supplier.

2. Installation

This chapter describes how to mount the option mounting plate and an option board in the main product. Up to three different option boards and one communication board can be mounted.

2.1 Polarisation of flat cables

The flat cable is marked with colour on one side and has a tap on the micromatch male contact. This side must be matched to the female micromatch contact on the control board and option board respectively, where a small hole in the board is located.

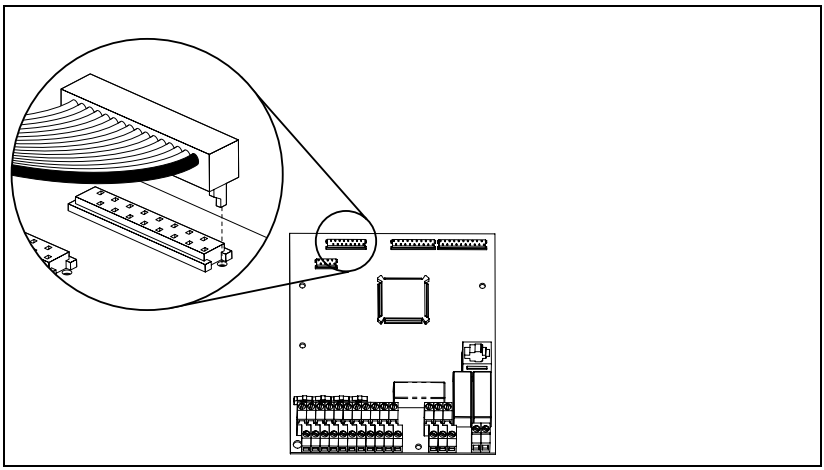


Fig. 1 Polarisation of flat cable

CAUTION: Incorrect connection might cause damage to both the option and to the control board/external equipment.

2.2 Mechanical mounting

Make sure that the main product has been switched off for at least five minutes to ensure that the capacitor bank is discharged before continuing with installation! Also make sure that no external equipment connected to the drive's interface is switched on.

NOTE: Correct installation is essential for fulfilling the EMC requirements and for proper operation of the module.

2.2.1 Option mounting plate

Delivered with the option mounting kit

The option mounting plate must be mounted before any option can be installed. The mounting plate may already be installed in the main product. In that case go directly to section 2.3 on page 8 for further mounting instructions. The option mounting kit consists of the following:

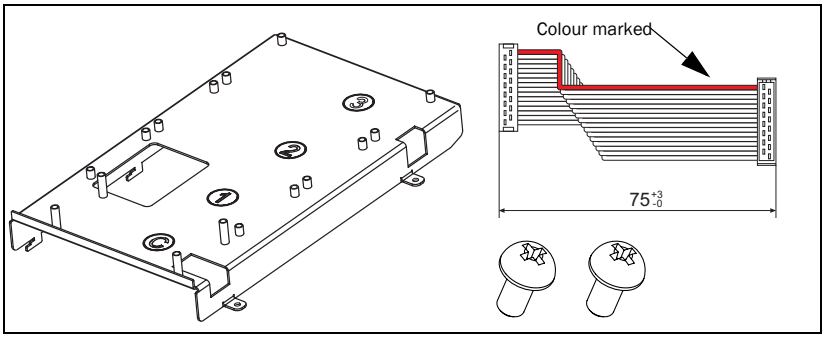


Fig. 2 Option mounting kit

- One mounting plate with the slots marked C, 1, 2 and 3. C = communication option.
- 2 screws
- One 16-pole flat cable for connection to the control board when mounting option boards on position 1.

Mounting

1. Make sure that the power supply is switched off for at least 5 minutes before opening the variable speed drive.
2. Open the door to the variable speed drive.
3. Jack the option mounting plate on to the control board mounting plate as shown in Fig. 3. It can only be turned in one direction.
4. Drag the option mounting plate towards the control board until the screw holes match. Keep the side with the screw holes tilted up slightly until the RJ45 contact fits into its hole.

NOTE: Be careful not to damage the RJ45 contact (connection for the control panel), see picture below.

5. Secure the plate with the two screws.

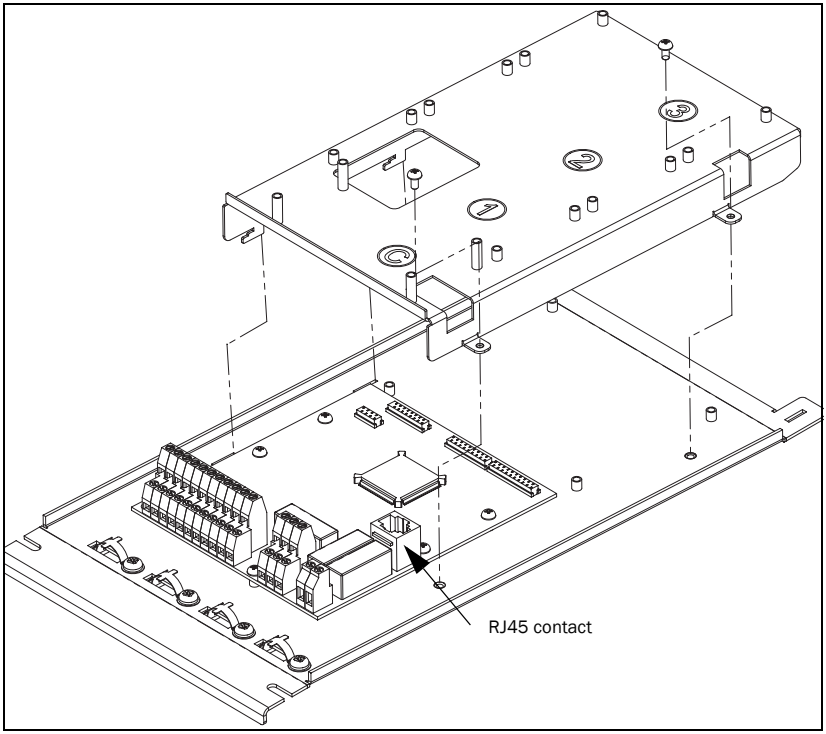


Fig. 3 Mounting the option mounting plate on the control board

2.3 Mounting the first option board

Thefirst option board is always mounted on the slot marked 1 on the mounting plate. In this example we assume that no other option board is installed.

Delivered with the option board kit

- Option board and four screws.
- 16-pole flat cable for connection between two option boards.
- Insulating sheet.

Mounting

6. Connect the 16-pole flat cable to the X5 connector on the control board with the cable downwards as in Fig. 4.

NOTE: The polarisation of the flat cable, see section 2.1 on page 5.

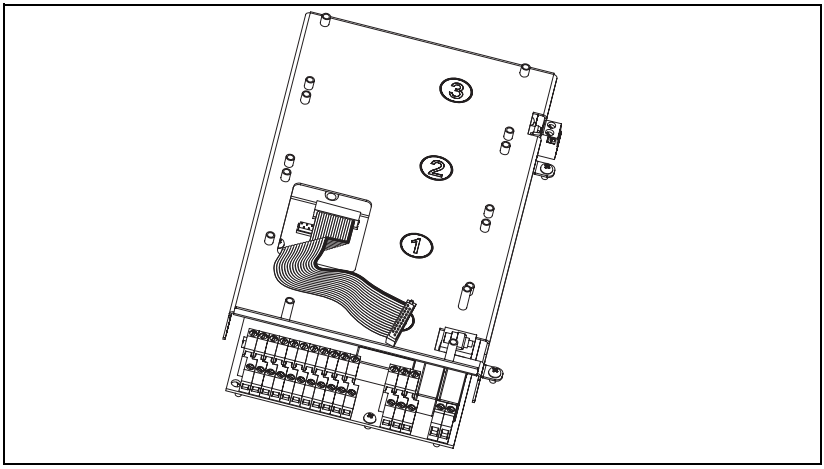


Fig. 4 Flat cable connected to the control board

7. Place the insulating sheet over the short spacers on the slot marked 1 on the mounting plate. Make sure the edge bent upwards is mounted towards the control board interface as in the figure below.

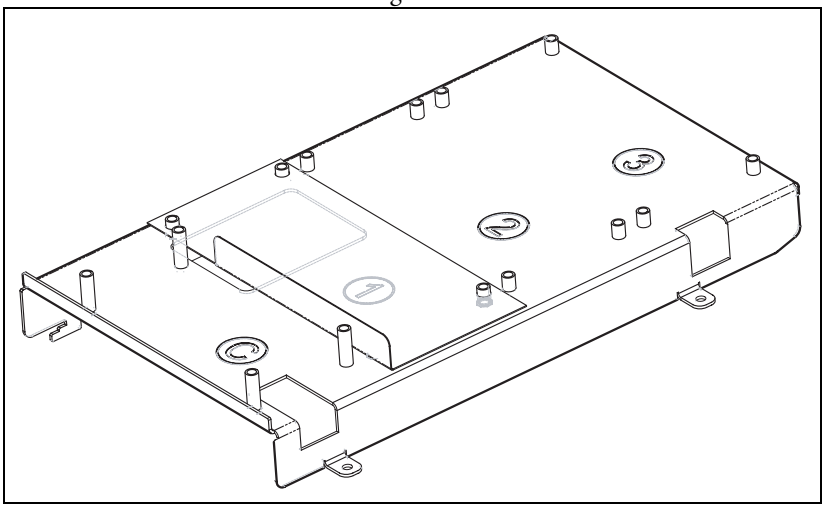


Fig. 5 Mounted insulating sheet

8. Connect the other end of the 16-pole flat cable to the X5A connector on the option board. Make sure that the polarisation is correct as in section 2.1 on page 5.

NOTE: Connect the micro match male contact to the option in the same manner as on the control board, i.e. the tap on the micro match contact must be fitted into the hole in the PCB.

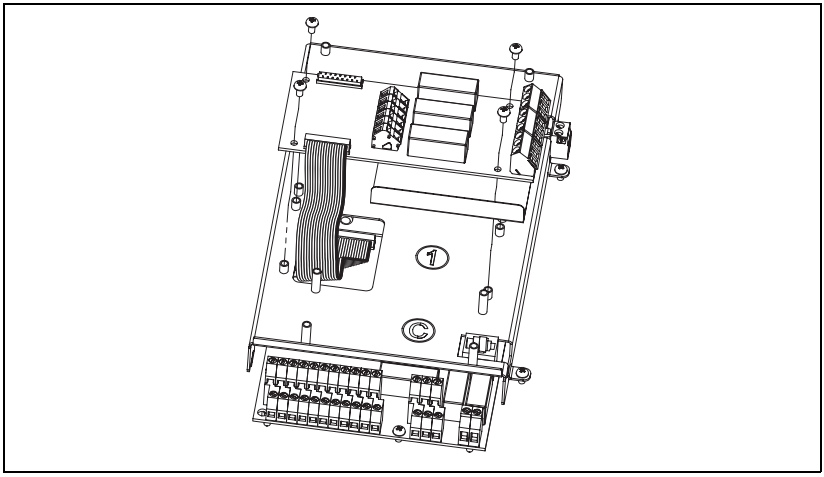


Fig. 6 Flat cable connected to the option board

9. Put the option board on the spacers.
10. Fasten the board using the four screws.

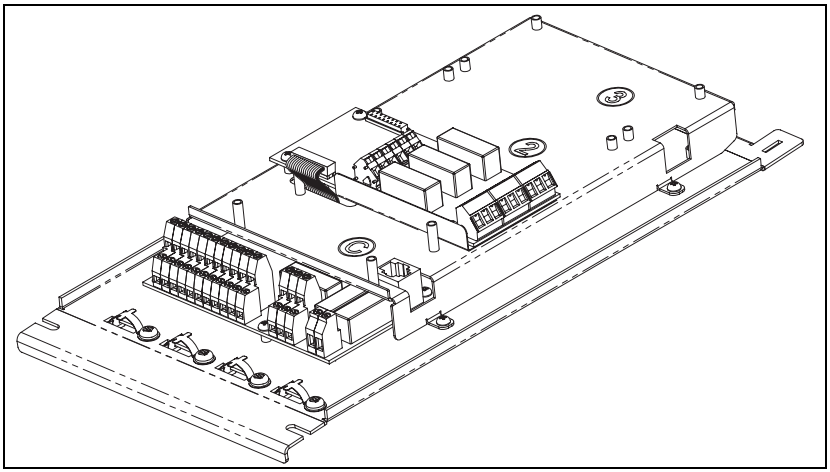


Fig. 7 Mounted option board

2.4 Mounting another option board

1. Place the insulating sheet on the spacers on the option board slot marked 2 or 3. It is necessary to select the slot closest to the already mounted option board.

NOTE: Place the insulating sheet with the turned up edge facing the interface of the control board to achieve proper insulation between the option boards.

2. Put the option board on the spacers.
3. Fasten the option board on the spacers using the four screws.
4. Connect the short flat cable between the X5B connector on the first option board and the X5A connector on the option board you have just mounted.

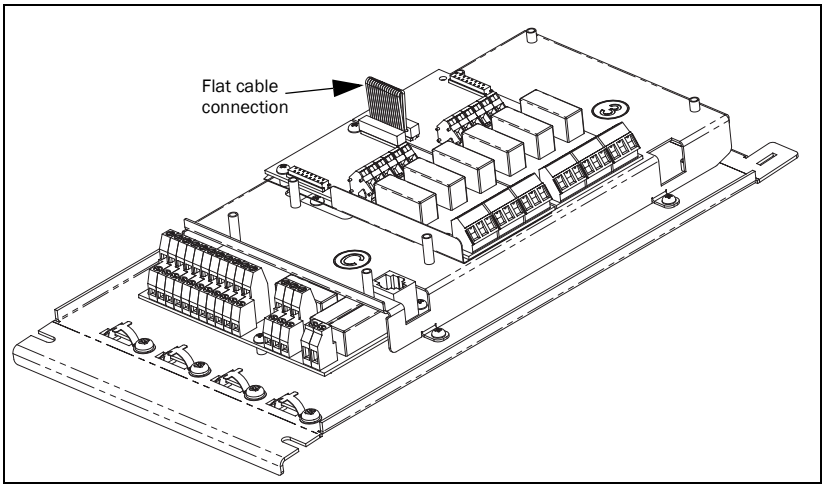


Fig. 8 Two option boards mounted on the option mounting plate

3 I/O board connections and functions

3.1 Board layout

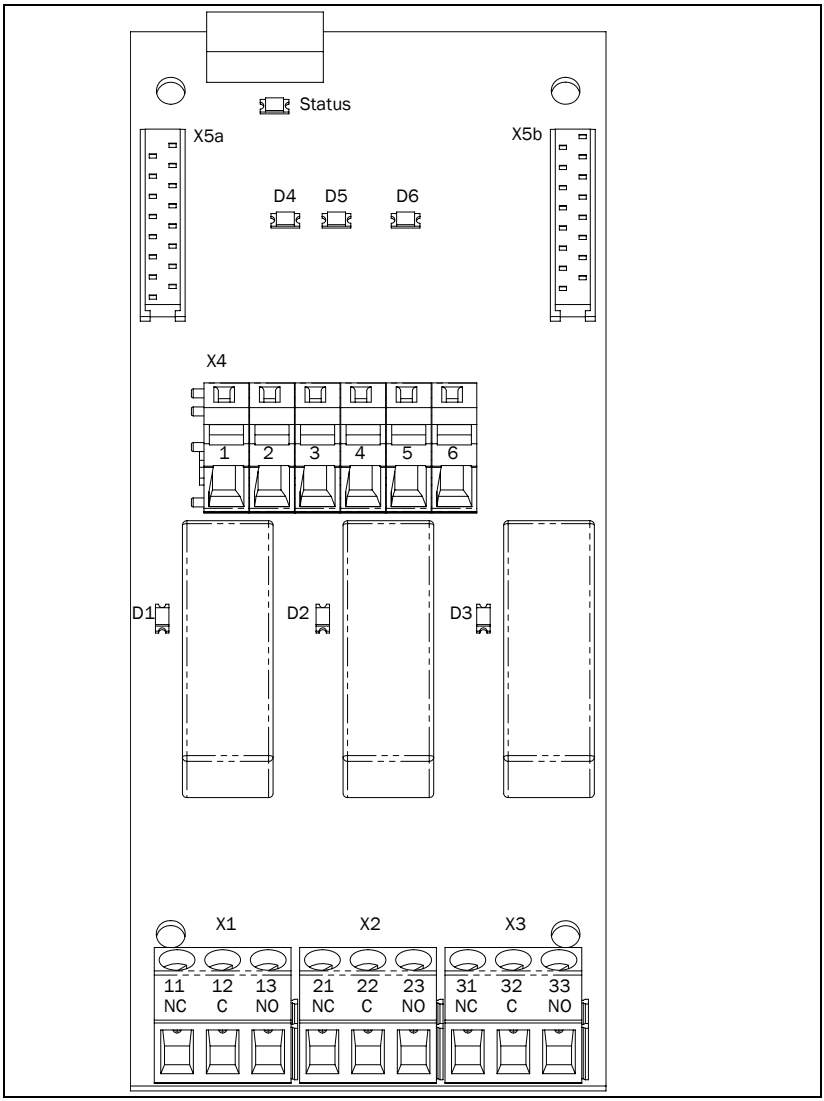


Fig. 9 I/O board layout

3.2 User connections

Table 1 Function of terminal strip X1, X2 and X4.

X1	Name	Function (default)	Signal	Type
1	N/C	Relay B1(2,3)R1 programmable output	Potential free change over 2A/250VAC/AC1	Relay output
2	COM			
3	N/O			
X2				
1	N/C	Relay B1(2,3)R2 programmable output	Potential free change over 2A/250VAC/AC1	Relay output
2	COM			
3	N/O			
X3				
1	N/C	Relay B1(2,3)R3 programmable output	Potential free change over 2A/250VAC/AC1	Relay output
2	COM			
3	N/O			
X4				
1	DigIn1 +	Board 1 (2,3) Digital input 1	0-24VDC or 0-24VAC, imp. 3.2kΩ **See CAUTION below table.**	Differential digital input
2	DigIn1 -			
3	DigIn2 +	Board 1 (2,3) Digital input 2	0-24VDC or 0-24VAC, imp. 3.2kΩ **See CAUTION below table.**	Differential digital input
4	DigIn2 -			
5	DigIn3 +	Board 1 (2,3) Digital input 3	0-24VDC or 0-24VAC, imp. 3.2kΩ **See CAUTION below table.**	Differential digital input
6	DigIn3 -			

CAUTION: Galvanic isolation between digital inputs is limited. Maximum allowed voltage difference between digital inputs: 50 VDC or 50 VAC.

Table 2 Cable specification

Signal type	Maximum wire size	Tightening torque	Cable type
Digital	Rigid cable: 0.14 to 2.5 mm^2 Flexible cable: 0.14 to 1.5 mm^2 Cable with ferrule: 0.25 to 1.5 mm^2	0.5 Nm	Screened
Relay			Not screened

3.3 LEDs

The LEDs on the I/O board indicate the following functions:

Table 3 LED description

LED	Description
Status	Blinking slow (1Hz) = OK Blinking fast = Communication Error Off = no power supply
D1	Relay 1 active when lit, X1:2 connected to X1:3
D2	Relay 2 active when lit, X2:2 connected to X2:3
D3	Relay 3 active when lit, X3:2 connected to X3:3
D4	DigIn 1 “ON” when lit *
D5	DigIn 2 “ON” when lit *
D6	DigIn 3 “ON” when lit *

* See threshold limits for digital inputs in § 4.1, page 17.

3.4 Internal connectors

Table 4 Internal connectors

Connector	Description
X5a	First option slot: 16-pole flat cable connected to the control board option connector X5. Second or third option slot: 16-pole flat cable from the previous option board
X5b	Connection to the next option board.

4 Use of the differential digital inputs

All digital inputs are isolated differential inputs. Isolation means that the common of the signal is not connected to the common of the inverter, nor with the common of any other input or output. One of the advantage of this is that control signals from different PLCs with a different common potential can be connected without any problem.

Another advantage of using differential inputs is that the input is less sensitive to external interference.

Sometimes it can be convenient to use the same source (0 V reference) for both the I/O and control board for signals. This is fully possible. The power supply from the control board is limited, however, please see the note below.

NOTE: The maximum load of +24 V DC supply for the main product is limited. Please refer to the manual for the main product. The impedance of each digital input on the I/O board is 3.2 kOhm.

4.1 Threshold limits for digital inputs

The input is considered high when the voltage difference exceeds 8 V DC/AC and the input is considered low when voltage difference is below 5 V DC/AC.

5 Functions

After the I/O board is installed, the software automatically detects the presence of the board and the related menus will subsequently appear and become active in the Setup Menu of the main product.

5.1 Menus and parameter settings

For a description of menus and parameter settings please refer to the manual for the main product.

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