

VACON®
AC DRIVES

OPTBK
AS-INTERFACE OPTION BOARD
USER MANUAL

INDEX

Document code(Original Instructions): DPD01311B

Rev. B

Revision release date: 22.5.15

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1. OPTBK AS-INTERFACE BOARD

1.1 GENERAL

The Actuator sensor Interface (AS-Interface or AS-i) is an economical system for the lower automation level. It is not a universal Fieldbus for all areas of automation. The AS-Interface is optimized to network binary sensors and actuators to the higher control level.

The AS-Interface is an intelligent form of cabling rather than a true fieldbus. It does not replace complex networks. Because the system has simple and cost-effective solutions, it suits well for the Sensor/Actuator Level. The cost-effective, rugged AS-Interface components are especially suited for use in harsh industrial environments. AS-i products are certified by the AS-International user organization that guarantees worldwide compatibility. Vacon is AS-International member since January 2013.

The installation of AS-interface is both easy and cost-effective. Because the AS-interface is a simple, defined electromechanical interface, no special expertise is necessary in the installation. It has a quick "Snap and Go" cable penetration system. The installation is easy because the AS-interface has freely selectable network topology. Also the configuration is easy. Only some prior knowledge is necessary for the assembly, which reduces downtime when faults occur.

The fault susceptibility of other systems often results in assembly delays, so the AS-Interface was consciously designed to reduce error sources. The special profile of the AS-Interface cable prevents reversal of the poles when connecting devices.

1.2 TECHNICAL DATA

VACON® AC drives can be connected to the ASI bus system using a OPTBK AS-I board.



Internal components and circuit boards are at high potential when the AC drive is connected to the power source. This voltage is extremely dangerous and may cause death or severe injury if you come into contact with it.



The relay outputs and other I/O-terminals may have a dangerous control voltage present even when the AC drive is disconnected from mains.



It is not allowed to add or replace option boards on an AC drive with the power switched on. This may damage the boards.

NOTE! When experiencing problems with AS-I functionalities, please contact Fieldbus@vacon.com.

1.2.1 AS-INTERFACE TECHNICAL DATA

Network type:	Master/Slave Communication System
	AS-Interface profile S-7.A.7 (AS-i specifications 3.0)
	IO code 7
	ID code A
	ID1 code 7
	ID2 code 7
Topology:	Very flexible with Line, Bus, Star or Tree Topology
Installation:	Special (yellow) unshielded cable with 2 wires providing data and 30 V. Alternatively data and power on separate cables 100 m length per Segment, extendible up to 300 m with Repeaters
Max. current consumption:	150 mA
Data Rate:	167 kBit/s
Max. Stations:	1 Master and up to 62 Slaves
Data:	each Slave: - 4 bit digital Input and 4 bit digital Output Data
Network Features:	Data values become refreshed at the slave in less than 21 ms; all 4 output bits operate simultaneously
User Organization:	AS-International

Table 1. AS-interface technical data

The AS-interface is a simple master-to-slave structure. The master controls all time and network traffic. The protocol is embedded in the hardware. There are no configuration files to maintain. All nodes are "AB Slaves". The slaves have a maximum of 4 discrete input bits and 4 discrete output bits. The address range is 1A-31A and 1B-31B, with 0 being reserved for new incoming slaves. "0" is the default address set by manufacturers when a slave leaves the factory.

The board can be configured with the bits as the following table:

Parameter bits	
P0	Communication monitoring (Watchdog) P0 = 0 monitoring = off, the outputs maintain the status if communication fails (default setting) P0 = 1 monitoring = on, i.e. if communication fails, the outputs are deenergised
P1	Input filter P1 = 0 input filter on, pulse suppression (default setting) P1 = 1 input filter off
P2	Synchronous mode P2 = 0 synchronous mode on (default setting) P2 = 1 synchronous mode off
P3	Not used

Table 2. Description of parameter bit function.

1.2.2 AS-I BOARD LAYOUT AND CONNECTIONS

Both data and power are supplied on the two-wire cable. The DC power carries the AS-interface signal. The AS-interface signal and the voltage regulating circuitry of the power supply must be separated.

Do not ground the AS-interface negative (ASI N). Grounding the signal lines results in poor communication or completely lost communication. The typical AS-interface media is not shielded. If shielding is necessary for the application, ground the shield in only one place.

The AS-interface power supply provides voltages in the 30VDC range (29.5-31.6 VDC). It is higher than the industry standard nominal 24VDC to compensate for the voltage drop on the line as well as the drop through the AS-interface IC chip.

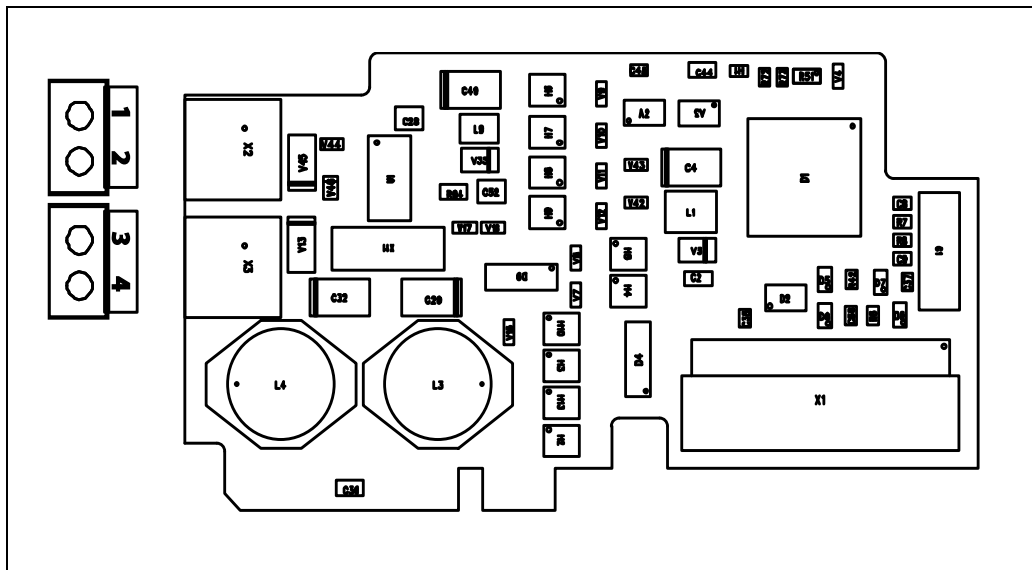


Figure 1. OPTBK AS-interface option board.

OPTBK AS-interface terminals		
Terminal	Signal	Technical information
1	ASI P	AS-interface +
2	ASI N	AS-interface -
3	ASI Supply P	Auxiliary output voltage (ASi voltage input - max 2.4V at maximum output current)
4	ASI Supply N	GND of Auxiliary output voltage

Table 3. OPTBK AS-Interface terminals

1.2.3 PHYSICAL MEDIA

AS-interface is available in both flat cable with IDC (Insulation Displacement Cable) connectors or round cable with industry standard M12 EN50 044 connectors.

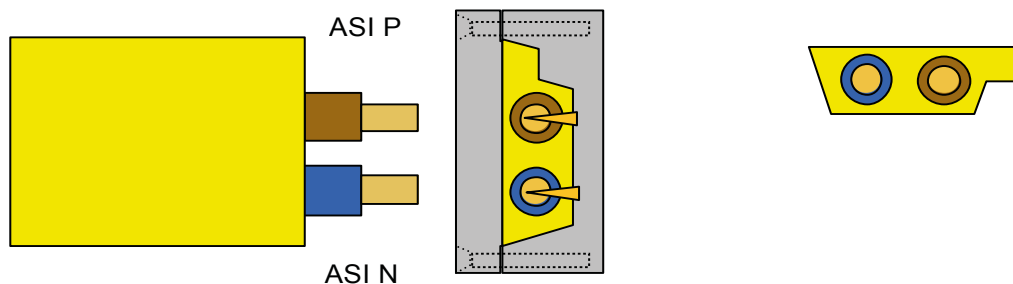


Figure 2. AS-interface Flat Cable. Right figure shown with piercing teeth.

Cross section of the wires	
EU	US
2 x 15 mm ²	2 x 18 AWG

Table 4. Cross sectional size of the wires.

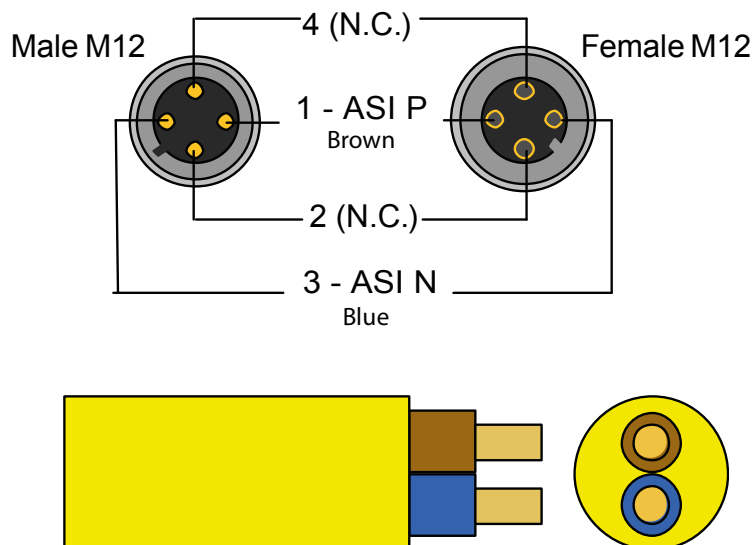


Figure 3. AS-interface round cable with industry standard M12 EN50 044 connector.

1.2.4 LED INDICATIONS

There are two LED indications next to the connector on the bottom side of the option board as show in the picture below.

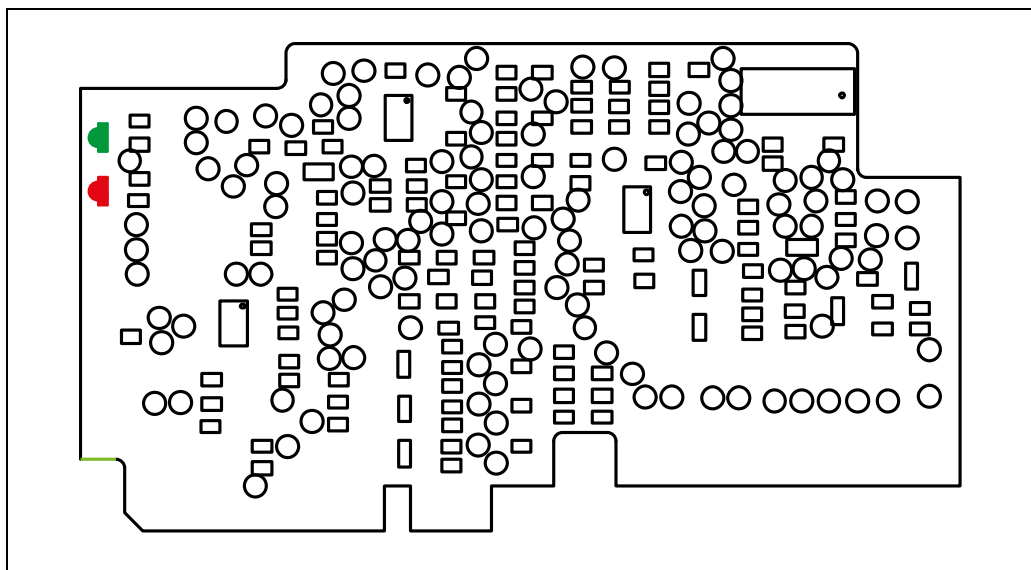


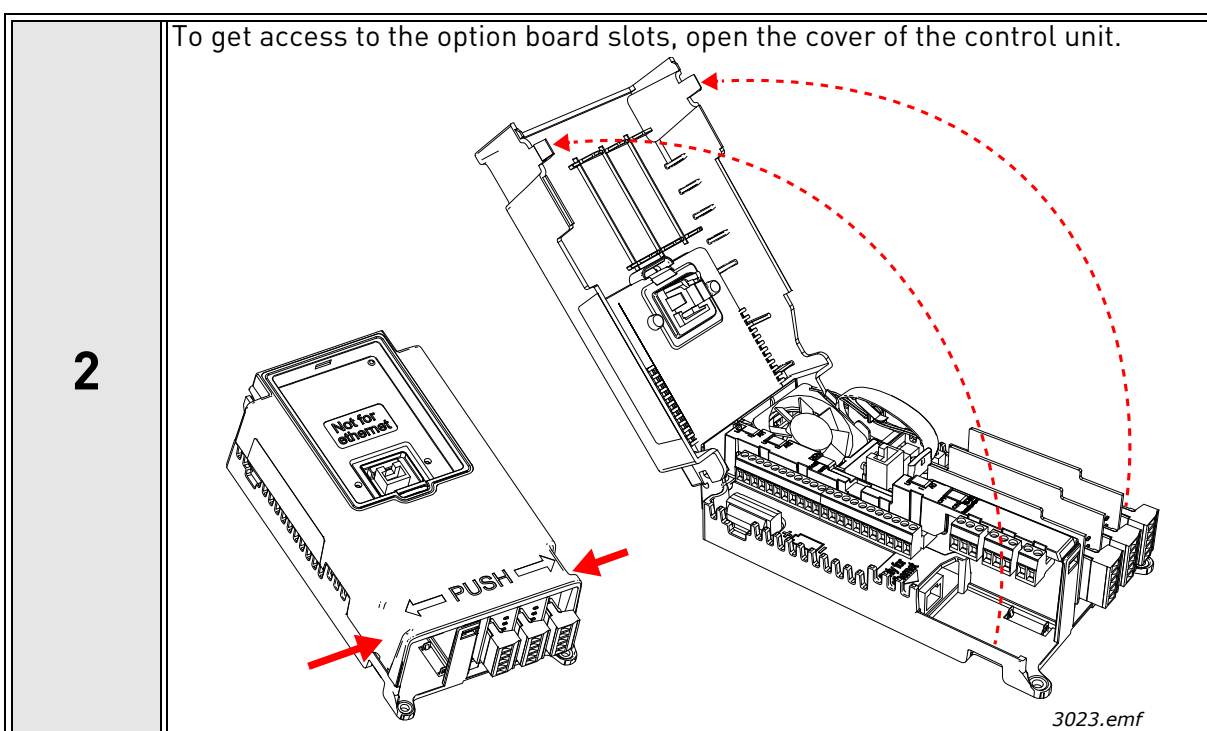
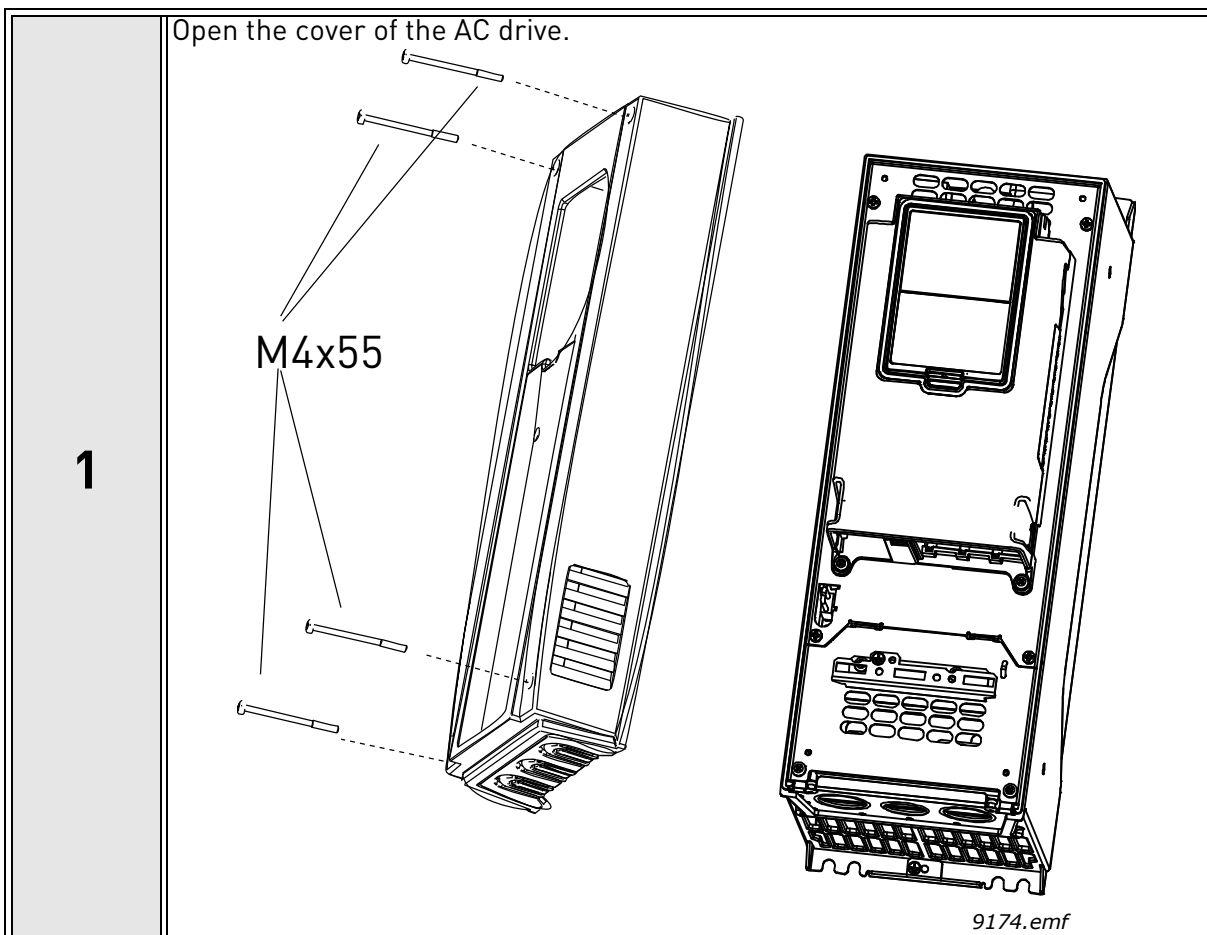
Figure 4. LED position on the option board.

LED indications			
Green LED is:	Red LED is:	Meaning	Note
OFF	OFF	Power OFF	No power supply available
ON	OFF	Normal Operation	Data communication is established
ON	ON	No data exchange	IC is waiting for a Write_Parameter request.
Flashing	ON	No data exchange (Address = 0)	Slave is waiting for address assignment. Data Port communication is not possible.
ON	Flashing	Periphery Fault	Communication Error

Table 5. LED indications.

2. OPTION BOARD INSTALLATION

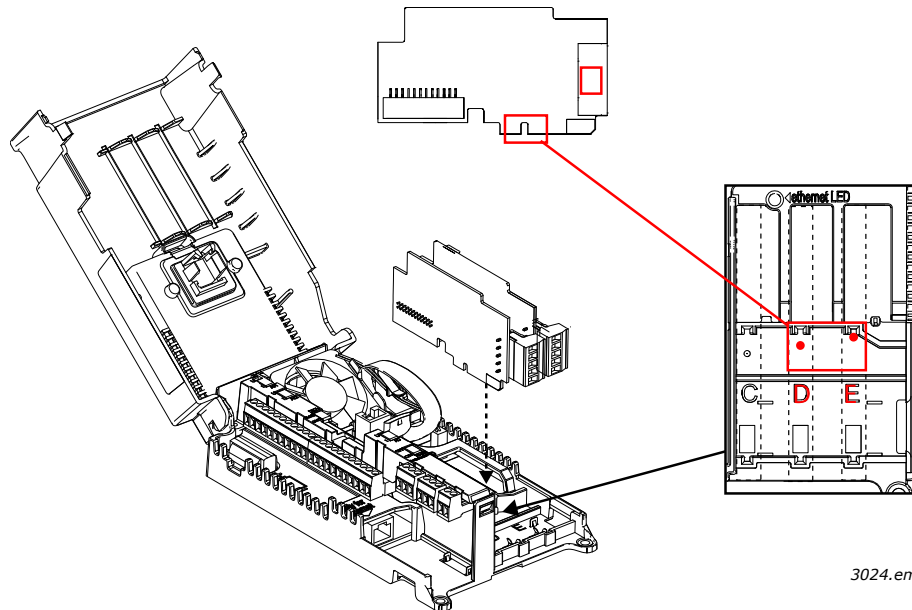
2.1 VACON 100



3

Install the option board into correct slot D or E.

The option board has a slot coding, and thus it is not possible to install the option board in an incorrect slot.

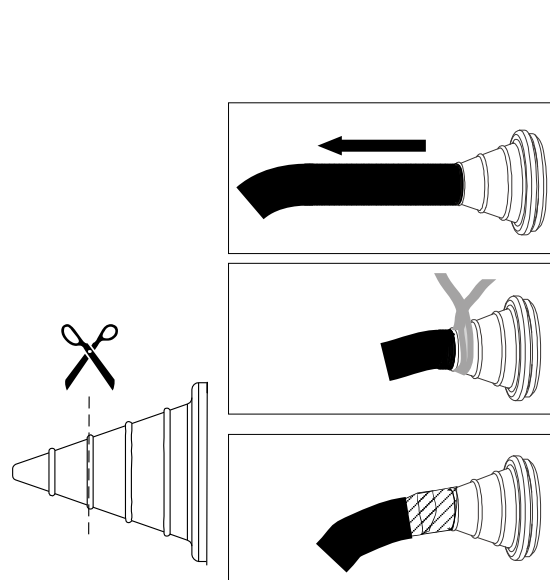
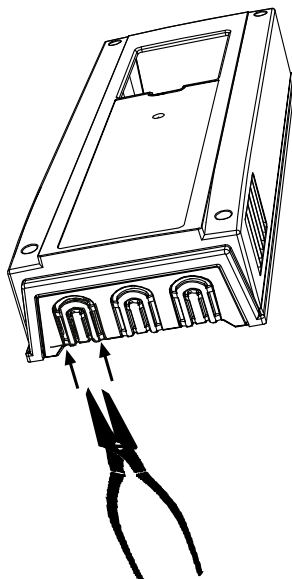
**4**

Close the cover of the control unit.

5

In IP21, cut free the opening on the cover of the AC drive for the AS-I cable.

In IP54, cut a hole in a grommet and move the cable through it. Make the connection tight.



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6

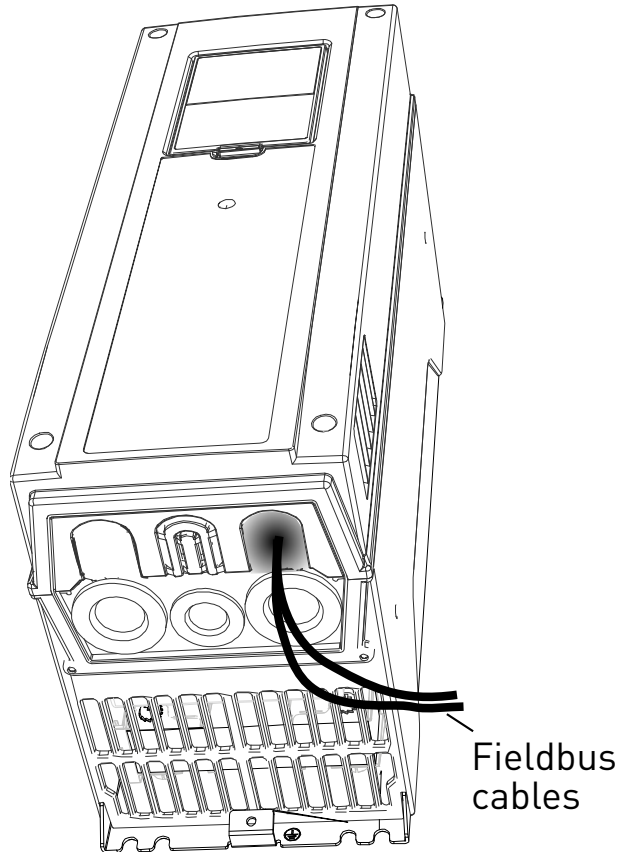
Install AS-interface cables and other cables.

7

Close the cover of the AC drive.

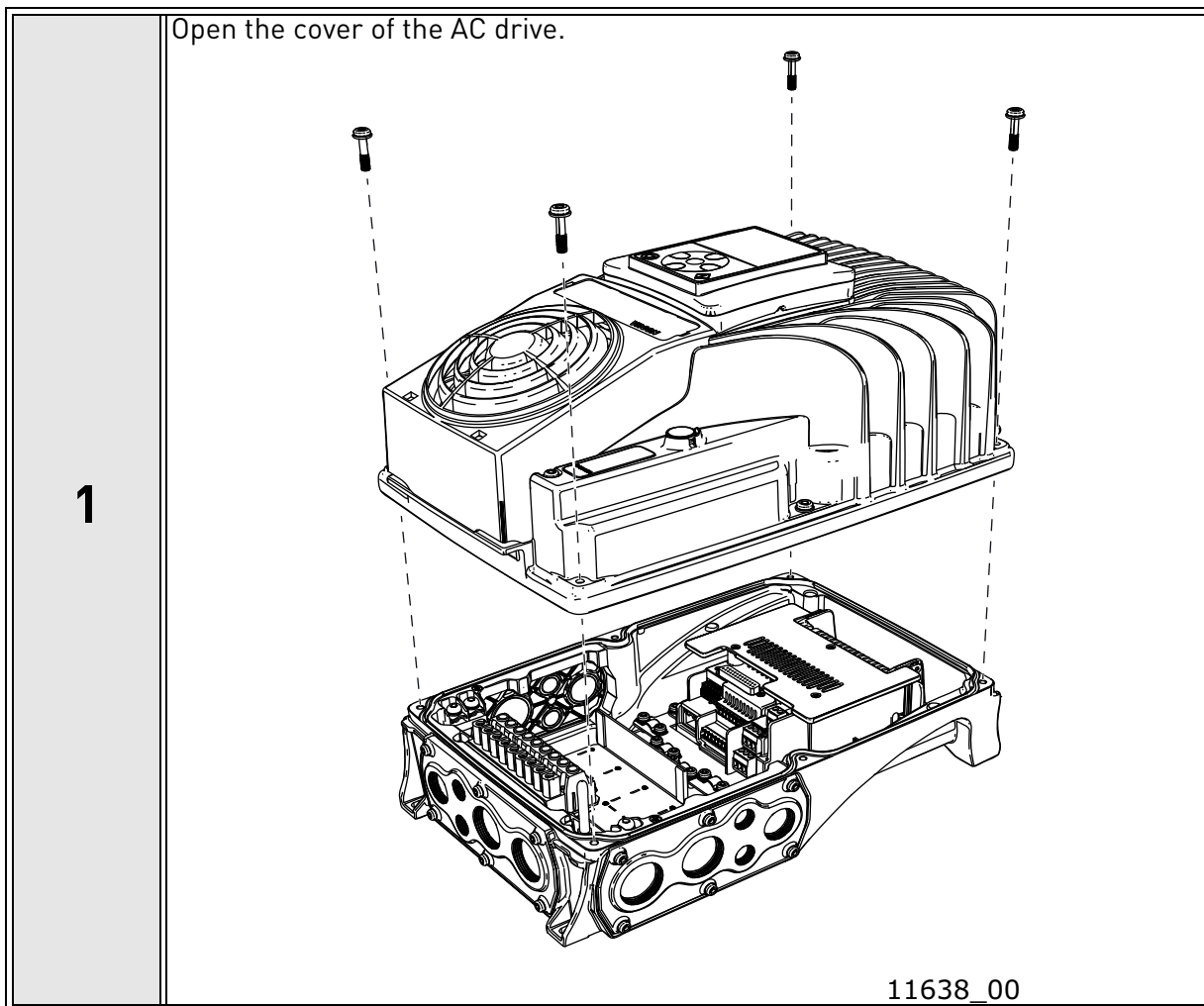
8

Pull the AS-interface cable to the side. Move the cable away from the mains cable and the motor cable.



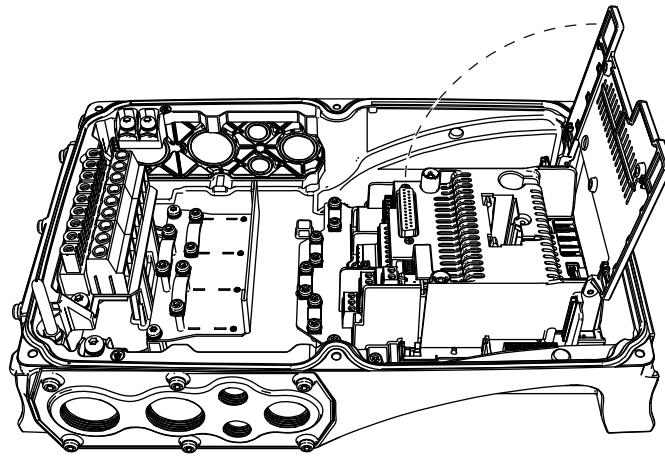
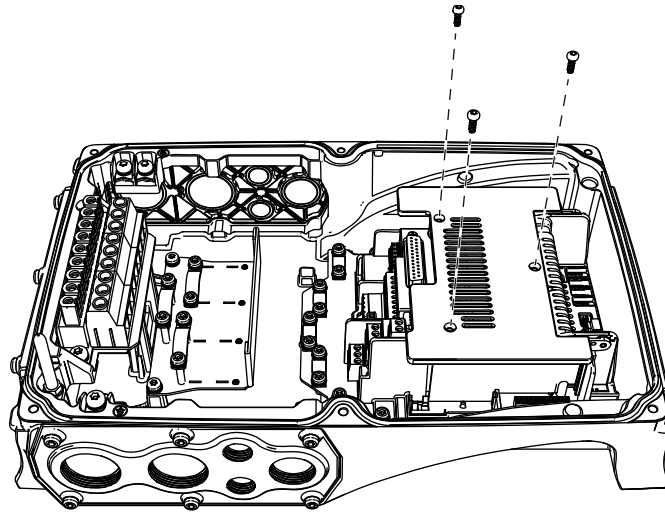
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2.2 VACON 100 X



2

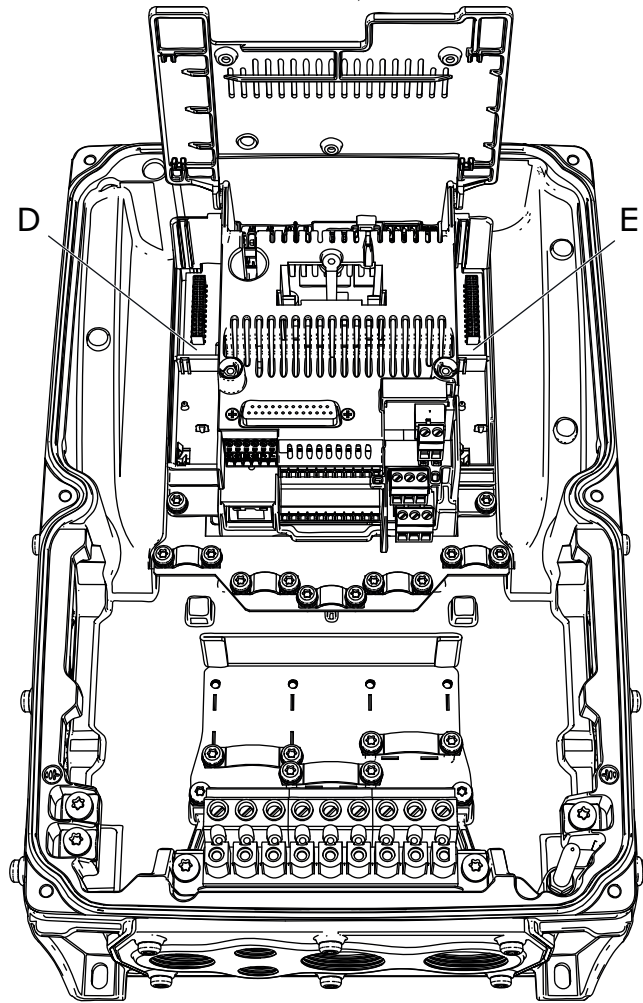
To get access to the option board slots, remove the screws and open the cover of the control unit.



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3

Install the option board into the correct slot, D or E.



11640_00

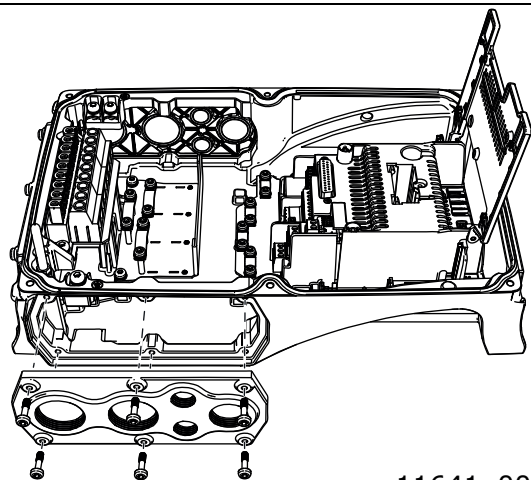
4

Close the option board cover.

5

Remove the cable entry plate. If you installed the option board in the slot D, use the cable entry plate on the right side. If you installed the option board in the slot E, use the cable entry plate on the left side.

NOTE! The cable entry plate at the bottom of the drive is used only for mains and motor cables.



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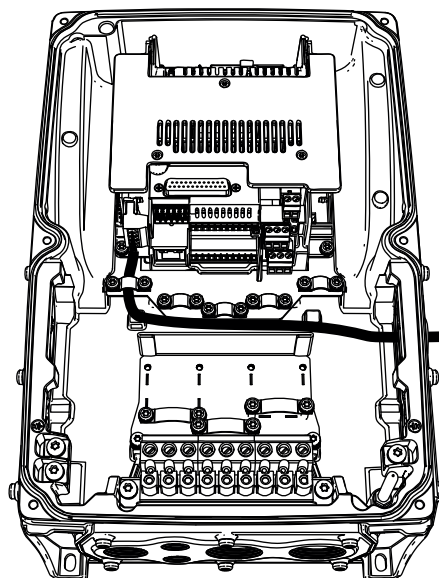
6

Open the necessary holes in the cable entry plate. Do not open the other holes. See the Vacon 100X Installation Manual for the dimensions of the holes.

7

Attach a cable gland on the hole in the cable entry plate. Pull the AS-interface cable through the hole.

NOTE! The AS-interface cable must go through the correct cable entry plate to avoid going near the motor cable.



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8

Put the cable entry plate back.

9

Close the cover of the AC drive.

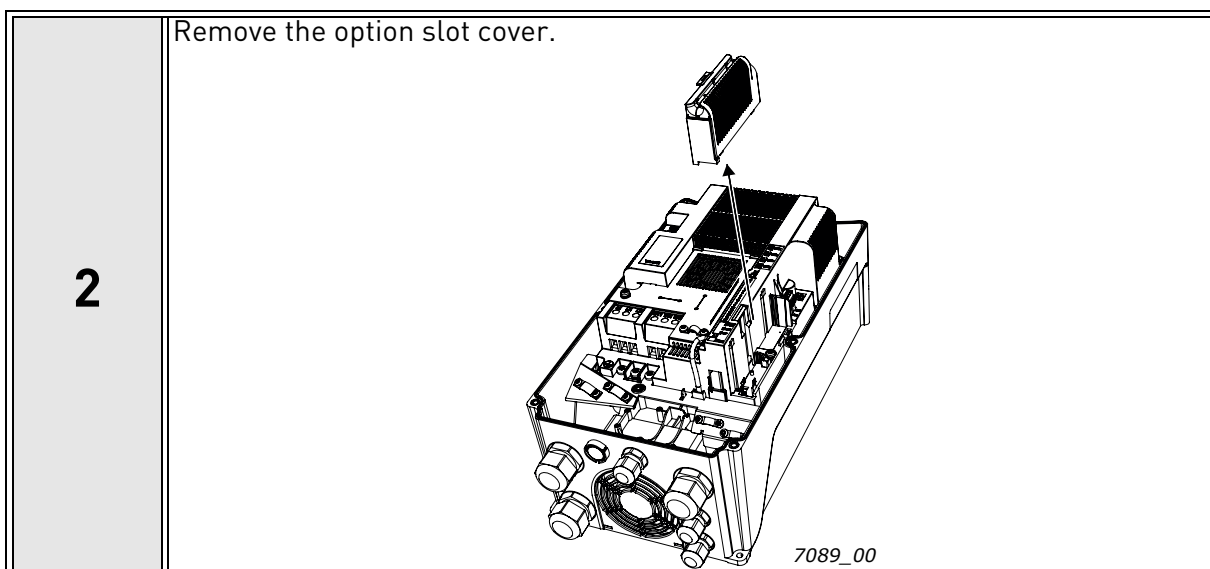
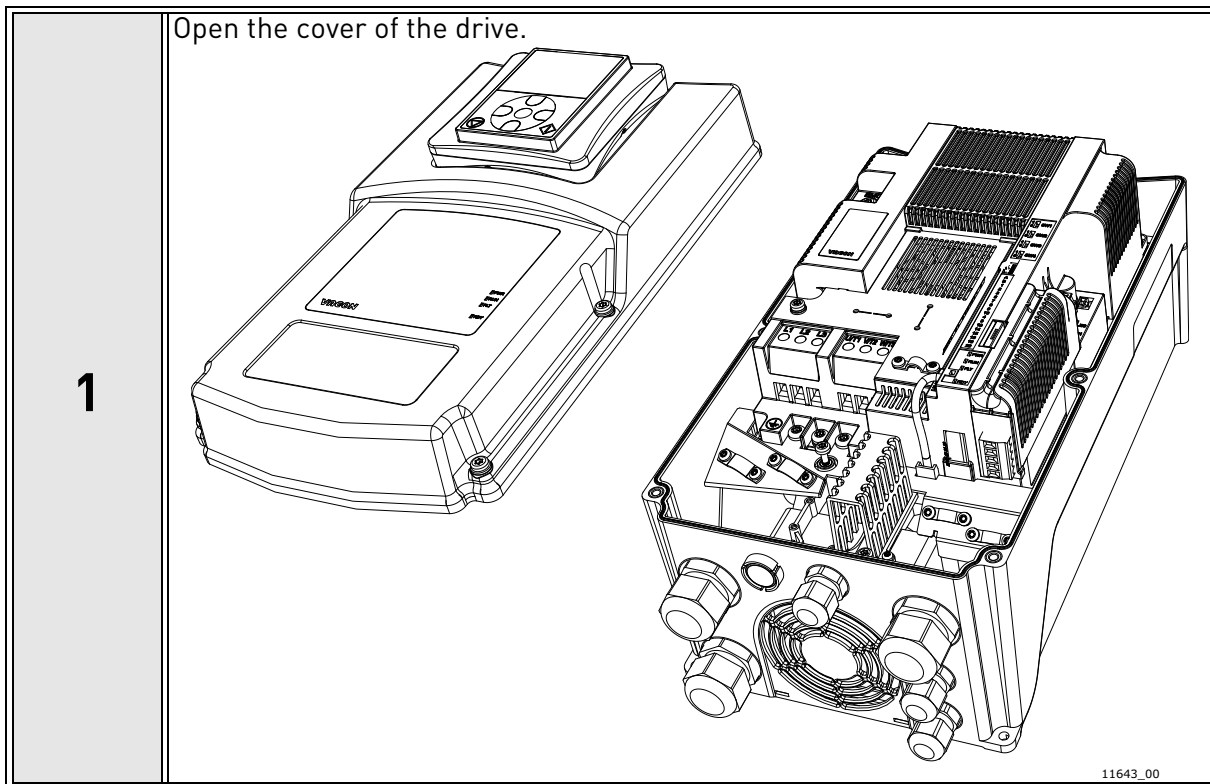
2.3 VACON 20 X



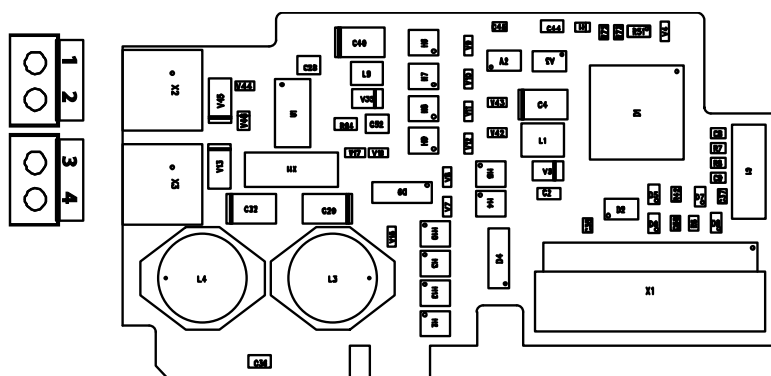
NOTE! It is not allowed to add or replace option boards or fieldbus boards on an AC drive with the power switched on. This may damage the boards.



The relay outputs and other I/O-terminals may have a dangerous control voltage present even when the drive is disconnected from mains.



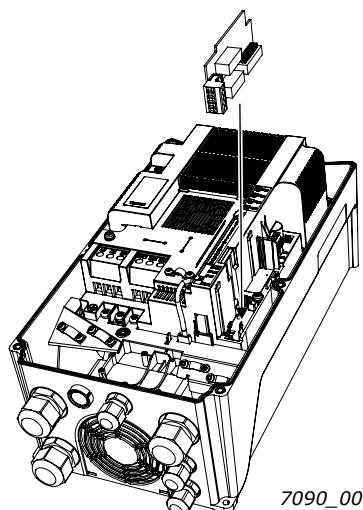
3



NOTE: Incompatible boards cannot be installed on Vacon 20X. Compatible boards have a slot coding that enable the placing of the board (see above)

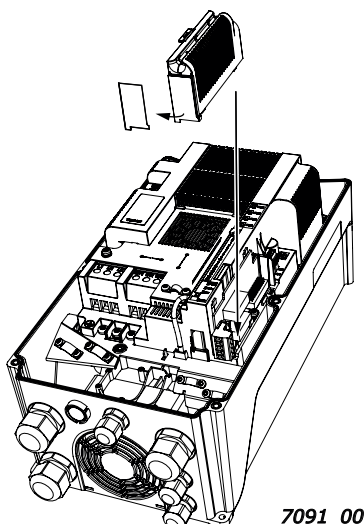
4

Install the option board into the slot as shown in the picture below.



5

Mount the option slot cover.



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Document ID:



Rev. B

Sales code: DOC-OPTBK+DLUK