

Installation Instructions

VLT[®] Analog I/O Option MCB 109 FC Series FC 102, FC 103, and FC 202

These installation instructions provide information about installation and use of the VLT[®] Analog I/O Option MCB 109. The instructions are targeted at users already familiar with the VLT[®] HVAC Drive FC 102, VLT[®] Refrigeration Drive FC 103, or VLT[®] AQUA Drive FC 202. Read the instructions before installation and ensure that instructions for safe installation are observed.

Additional resources

Further manuals and instructions are available for download at www.vlt-drives.danfoss.com/Products/Detail/Technical-Documents---contextless/.

Items supplied

The VLT[®] Analog I/O Option MCB 109 is available in a standard version (code number 130B1143) and in a coated version (code number 130B1243)

Items supplied

- VLT[®] Analog I/O Option MCB 109
- Extended LCP (local control panel) frame (for use with enclosure sizes A2, A3, B3, and B4)
- Terminal covers (various sizes for use with enclosure sizes A2, A3, and B4)

Product Overview

The VLT[®] Analog I/O Option MCB 109 increases the number of available inputs and outputs at the frequency converter. Additionally, it provides a battery back-up for the built-in clock function in the frequency converter.

Features

- 3 analog inputs, each configurable as both voltage and temperature input.
- Connection of 0–10 V analog signals as well as PT1000 and NI1000 temperature inputs.
- 3 analog outputs each configurable as 0–10 V outputs.
- Battery back-up for the built-in clock function in the frequency converter. The back-up battery typically lasts for 10 years, depending on environment.

Safety

Qualified Personnel

Only qualified personnel are allowed to install or operate this equipment. Qualified personnel is defined as trained staff, who are authorised to install, commission, and maintain equipment, systems, and circuits in accordance with pertinent laws and regulations. Additionally, the personnel must be familiar with the instructions and safety measures described in the product specific *operating instructions*.

⚠ WARNING

DISCHARGE TIME

The frequency converter contains DC-link capacitors, which can remain charged even when the frequency converter is not powered. Failure to wait the specified time after power has been removed before performing service or repair work, could result in death or serious injury.

1. Stop the motor.
2. Disconnect the AC mains, permanent magnet type motors, and remote DC-link power supplies, including battery back-ups, UPS, and DC-link connections to other frequency converters.
3. Wait for the capacitors to discharge fully before performing any service or repair work. The duration of waiting time is specified in *Table 2.1* to *Table 2.3*.

Voltage [V]	Minimum waiting time (minutes)		
	4	7	15
200-240	1.1–3.7 kW	–	5.5–45 kW
380-480	1.1–7.5 kW	–	11–90 kW
525-600	1.1–7.5 kW	–	11–90 kW
525-690	–	1.1–5 kW	11–90 kW
High voltage may be present even when the warning LED indicator lights are off.			

Table 2.1 Discharge Time, VLT[®] HVAC Drive FC 102

Voltage [V]	Minimum waiting time (minutes)	
	4	15
200–240	1.1–3.7 kW	5.5–45 kW
380–500	1.1–7.5 kW	11–90 kW
525–600	1.1–7.5 kW	11–90 kW

High voltage may be present even when the warning LED indicator lights are off.

Table 2.2 Discharge Time, VLT® Refrigeration Drive FC 103

Voltage [V]	Minimum waiting time (minutes)		
	4	7	15
200–240	0.25–3.7 kW	–	5.5–45 kW
380–480	0.37–7.5 kW	–	11–90 kW
525–600	0.75–7.5 kW	–	11–90 kW
525–690	–	1.1–7.5 kW	11–90 kW

High voltage may be present even when the warning LED indicator lights are off.

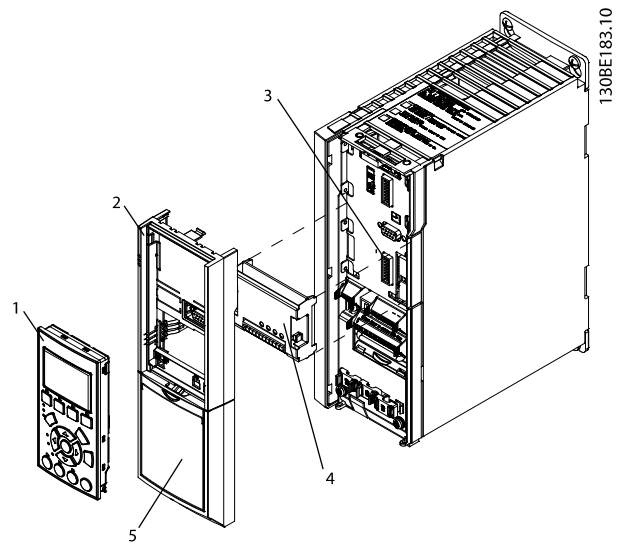
Table 2.3 Discharge Time, VLT® AQUA Drive FC 202

Installation

The installation procedure depends on the enclosure size of the frequency converter.

Enclosure Sizes A2, A3, B3, and B4

1. Remove the LCP (local control panel), the terminal cover, and the LCP frame from the frequency converter.
2. Fit the option into slot B.
3. Connect the control cables and relieve the cable. See *Illustration 5.1* for details about wiring.
4. Remove the knock-out in the extended LCP frame (supplied).
5. Fit the extended LCP frame and terminal cover on the frequency converter.
6. Fit the LCP or blind cover in the extended LCP frame.
7. Connect power to the frequency converter.

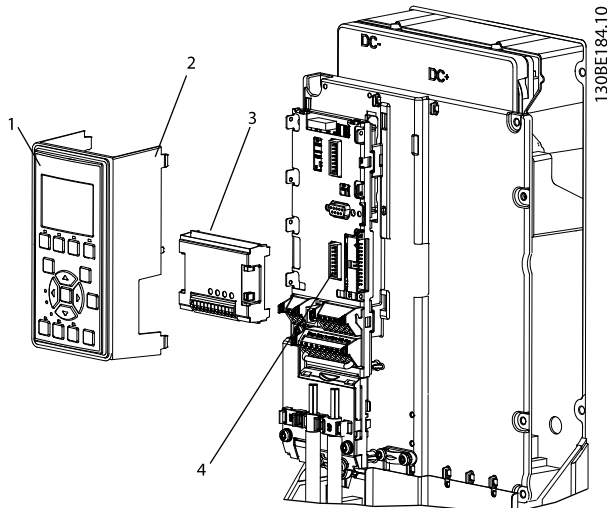


1	LCP
2	Terminal cover
3	Slot B
4	Option
5	LCP frame

Illustration 3.1 Installation in Enclosure Sizes A2, A3, B3, and B4

Enclosure Sizes A5, B1, B2, C, D, E, and F

1. Remove the LCP (local control panel) and the LCP cradle.
2. Fit the option card into slot B.
3. Connect the control cables and relieve the cable. See *Illustration 5.1* for details about wiring.
4. Fit the cradle on the frequency converter.
5. Fit the LCP in the cradle.



1	LCP
2	LCP cradle
3	Option
4	Slot B

Illustration 3.2 Installation in Enclosure Sizes A5, B1, B2, C, D, E, and F

Configuration

Analog Inputs

Analog inputs can be used as:

- Voltage input.
Inputs are scalable by parameters for each input.
- Temperature sensor input.
Input scaling is preset to necessary signal level for specified temperature span. Optional feedback read-out value (°C or °F).

Configuring

- To configure the analog inputs, go to parameter groups 26-0* *Analog I/O Mode*, 26-1* *Analog Input X42/1*, 26-2* *Analog Input X42/3*, and 26-3* *Analog*

Input X42/5. Refer to the *programming guide*, for further details about programming of analog inputs.

- To read the analog input values, go to parameter group 18-3* *Inputs & Outputs*.

Analog Outputs

Analog outputs are used as voltage outputs.

Outputs are scalable by parameters for each output. VLT® Analog I/O Option MCB 109 analog output parameter options are identical to the parameter options for the built-in analog outputs of the frequency converter.

Configuring

- To configure the analog outputs, go to parameter groups for set-up: 26-4* *Analog Out X42/7*, 26-5* *Analog Out X42/9*, and 26-6* *Analog Out X42/11*.
- To read analog output values, go to parameter group 18-3* *Inputs & Outputs*.

Real-time Clock Back-up

No further configuration is required to use the VLT® Analog I/O Option MCB 109 as a battery back-up.

The back-up battery typically lasts for 10 years, when the frequency converter is operating at 40 °C ambient temperature. If the battery pack back-up fails, replace the analog I/O option.

Specifications

Block diagram

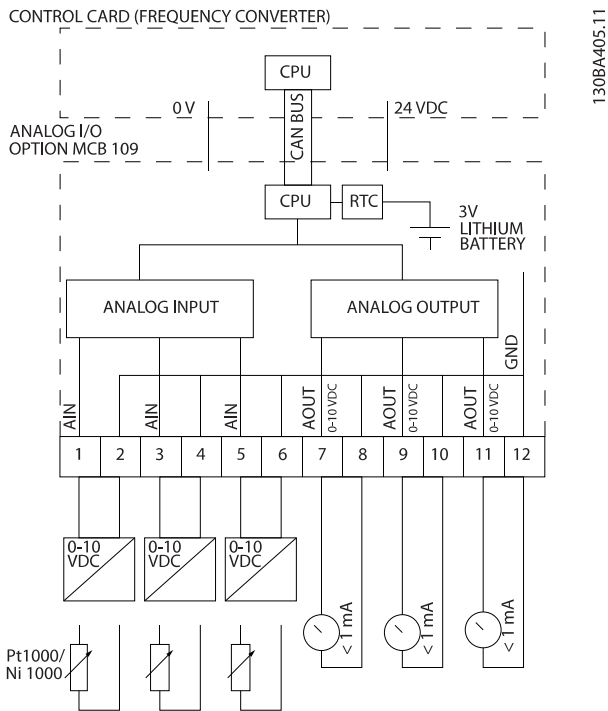


Illustration 5.1 Block Diagram for VLT® Analog I/O Option MCB 109 Mounted in the Frequency Converter.

Specifications

	Used as temperature sensor input	Used as voltage input
Number of inputs	3	3
Terminal	X42/1-6	X42/1-6
Voltage range	-	0-10 V DC
Current range	0/4-20 mA (voltage input 0-10 V)	-
Temperature sensor (1000 Ω at 0 °C)	Ni1000 (according to DIN 43760)	-
-	Pt1000 (according to IEC 60751)	-
Accuracy	-50 °C ±1 Kelvin +150 °C ±2 Kelvin	0.2% of full scale at calculated temperature
Temperature range	-50 °C to +150 °C	
Resolution	11 bits	10 bits
Sampling	3 Hz	2.4 Hz
Maximum load	-	±20 V continuously
Impedance	-	5 kΩ

Table 5.1 Analog Inputs

Number of outputs	3
Voltage level at analog output	0-10 V DC
Resolution	11 bits
Linearity	1% of full scale
Maximum load	1 mA

Table 5.2 Analog Outputs

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