

VLT[®] Drives FC Series Option Overview

An overview of available options for
VLT[®] HVAC Drive, VLT[®] Refrigeration Drive, VLT[®] AQUA Drive and VLT[®]
AutomationDrive.



Slot A



VLT® PROFIBUS DP MCA 101

Operating the frequency converter via a field bus enables you to reduce the cost of your system, communicate faster and more efficiently, and benefit from an easier user interface.

- VLT® PROFIBUS DP MCA 101 provides wide compatibility, a high level of availability, support for all major PLC vendors, and compatibility with future versions

- Fast, efficient communication, transparent installation, advanced diagnosis and parameterisation and auto-configuration of process data via GSD-file
- A-cyclic parameterisation using PROFIBUS DP-V1, PROFIdrive or Danfoss FC profile state machines, PROFIBUS DP-V1, Master Class 1 and 2

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1100 uncoated 130B1200 coated	●		●	●	●



VLT® PROFINET MCA 120

VLT® PROFINET MCA 120 uniquely combines the highest performance with the highest degree of openness. The MCA120 gives the user access to the power of Ethernet. The option is designed so that many of the features from the PROFIBUS MCA 101 can be reused, minimising user effort to migrate PROFINET, and securing the investment in PLC program.

- Support of DP-V1 Diagnostic allows easy, fast and standardized handling of warning and fault information into the PLC, improving bandwidth in the system

PROFINET encompasses a suite of messages and services for a variety of manufacturing automation applications, including control, configuration and information.

Other features:

- Built-in web server for remote diagnosis and reading out of basic drive parameters

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1135 uncoated 130B1235 coated	●		●	●	●



VLT® DeviceNet MCA 104

VLT® DeviceNet MCA 104 offers robust, efficient data handling thanks to advanced Producer/Consumer technology.

- This modern communications model offers key capabilities that let you effectively determine what information is needed and when
- Benefit also from ODVA's strong conformance testing policies, which ensure that products are interoperable

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1102 uncoated 130B1202 coated	●		●	●	●



VLT® DeviceNet Converter MCA 194 *

The VLT® DeviceNet Converter MCA 194 emulates VLT® 5000 commands in the VLT® AutomationDrive. This means that a VLT® 5000 can be replaced by the VLT® AutomationDrive or an existing system can be expanded, without costly change of the PLC program. For a later

upgrade to a different fieldbus, the installed converter can easily be removed and replaced with a different option. This secures the investment without losing flexibility. The option emulates I/O instances & explicit messages of a VLT® 5000.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
NA uncoated 130B5601 coated	●		●	●	●

* Release in Q1, 2013



VLT® EtherNet/IP MCA 121

Ethernet is the future standard for communication at the factory floor. The VLT® EtherNet/IP MCA 121 is based on the newest technology available for industrial use and handles even the most demanding requirements. EtherNet/IP extends commercial off-the-shelf Ethernet to the Common Industrial Protocol (CIP™) – the same upper-layer protocol and object model found in DeviceNet.

The VLT® MCA 121 offers advanced features as:

- Built-in high performance switch enabling line-topology, and eliminating the need for external switches
- Advanced switch and diagnoses functions
- Built-in web server
- E-mail client for service notification
- Unicast and Multicast communication

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1119 uncoated					
130B1219 coated	●		●	●	●



VLT® CANopen MCA 105

High flexibility and low cost are two of the “cornerstones” for CANopen. The VLT® CANopen MCA 105 option for the AutomationDrive is fully equipped with both high priority access to control and status of the Drive (PDO Communication) and access to all Parameters through acyclic data (SDO Communication).

For interoperability the option has implemented the DSP402 AC drive Profile. This all guarantees standardised handling, interoperability and low cost.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1103 uncoated					
130B1205 coated				●	●



VLT® EtherCAT MCA 124

The VLT® EtherCAT MCA 124 offers connectivity to EtherCAT based networks via the EtherCAT Protocol. The option handles the EtherCAT line communication in full speed, and connection towards the drive of a Interval down to 4 ms in both directions. This allows the MCA124 to participate in networks from low performance up to servo applications.

- CoE CAN over EtherCAT Support
- EoE Ethernet over EtherCAT support
- HTTP (Hypertext Transfer Protocol) for diagnosis via built-in web server
- SMTP (Simple Mail Transfer Protocol) for e-mail notification
- TCP/IP for easy access to Drive configuration data from MCT 10

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B5546 uncoated					
130B5646 coated				●	●



VLT® POWERLINK MCA 123

VLT® POWERLINK MCA 123 represents the second generation of fieldbus. The high bit rate of industrial ethernet can now be used to make the full power of IT technologies used in the automation world available for the factory world.

nication models, network management and device description model offers much more than just a fast communication network.

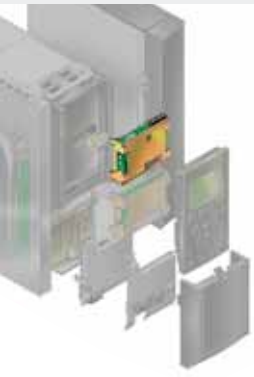
POWERLINK does not only provide high performance real-time and time synchronisation features. Due to its CANopen-based commu-

The perfect solution for:

- Dynamic motion control applications
- Material handling
- Synchronisation and positioning applications

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1489 uncoated					
130B1490 coated				●	●

Slot A



VLT® LonWorks MCA 108

LonWorks is a fieldbus system developed for building automation. It enables communication between individual units in the same system (peer-to-peer) and thus supports decentralising of control.

- No need for big main station (master-follower)
- Units receive signals directly

- Supports Echelon free-topology interface (flexible cabling and installation)
- Supports embedded I/Os and I/O options (easy implementation of de-central I/Os)
- Sensor signals can quickly be moved to another controller via bus cables
- Certified as compliant with LonMark ver. 3.4 specifications

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1106 uncoated 130B1206 coated	●				



VLT® BACnet MCA 109

The open communications protocol for worldwide building automation. The BACnet protocol is an international protocol that efficiently integrates all parts of building automation equipment from the actuator level to the building management system.

- BACnet is the world standard for building automation
- International standard ISO 16484-5

- With no license fees, the protocol can be used in building automation systems of all sizes
- The BACnet option lets the drive communicate with building management systems running the BACnet protocol
- Typical areas where BACnet is used include heating, ventilation, cooling and climate equipment control
- The BACnet protocol is easily integrated into existing control equipment networks

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1144 uncoated 130B1244 coated	●				



VLT® Modbus TCP MCA 122

Modbus TCP is the first industrial Ethernet based protocol for automation. The VLT® Modbus TCP MCA 122 connects to Modbus TCP based networks. It is able to handle connection interval down to 5 ms in both directions, positioning it among the fastest performing Modbus TCP devices in the market. For master redundancy it features hot swapping between two masters.

Other features:

- Built-in web-server for remote diagnosis and reading out basic drive parameters
- An e-mail notifiator can be configured for sending an e-mail message to one or several receivers, if certain warnings or alarms occurs, or has cleared again

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1196 uncoated 130B1296 coated	●		●	●	●



VLT® PROFIBUS Converter MCA 113

The VLT® PROFIBUS Converter MCA 113 is a special version of the Profibus options that emulates the VLT® 3000 commands in the VLT® AutomationDrive. The VLT® 3000 can then be replaced by the VLT® AutomationDrive, or the system can be expanded without costly change

of the PLC program. For upgrade to a different fieldbus, the installed converter is easily removed and replaced with a new option. This secures the investment without losing flexibility.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
NA uncoated 130B1245 coated					●



VLT® PROFIBUS Converter MCA 114

The VLT® PROFIBUS Converter MCA 114 is a special version of the Profibus options that emulates the VLT® 5000 commands in the VLT® AutomationDrive. The VLT® 5000 can then be replaced by the VLT® AutomationDrive, or the system can be expanded without costly change

of the PLC program. For upgrade to a different fieldbus, the installed converter is easily removed and replaced with a new option. This secures the investment without losing flexibility. The option supports DPV1.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
NA uncoated 130B1246 coated					●



VLT® LonWorks for ADAP-KOOL® MCA 107

ADAP-KOOL® is a complete electronic refrigeration and control system for monitoring and controlling refrigeration plants. Connecting

this drive to ADAP-KOOL® Lon network is really simple. After entering a network address, pressing a service pin starts the automatic configuration procedure.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1169 uncoated 130B1269 coated		●			



Slot B



VLT® General Purpose I/O MCB 101

This I/O option offers an extended number of control inputs and outputs:

- 3 digital inputs 0-24 V: Logic '0' < 5 V; Logic '1' > 10V

- 2 analogue inputs 0-10 V: Resolution 10 bit plus sign
- 2 digital outputs NPN/PNP push pull
- 1 analogue output 0/4-20 mA
- Spring loaded connection

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1125 uncoated 130B1212 coated	●	●	●	●	●



VLT® Encoder Input MCB 102

A universal option for connection of encoder feedback from either a motor or a process. Feedback for asynchronous or brushless servo (Permanent Magnet) motors.

Encoder module supports:

- Incremental encoders
- SinCos encoders as Hyperface®
- Power supply for encoders
- RS422 interface
- Connection to all standard 5 V incremental encoders
- Spring-loaded connection

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1115 uncoated 130B1203 coated				●	●



VLT® Resolver Input MCB 103

Supports resolver feedback for asynchronous or brushless servo (Permanent Magnet) motors.

- Primary Voltage..... 2 – 8 Vrms
- Primary Frequency..... 2.0 kHz – 15 kHz
- Primary current max..... 50 mA rms
- Secondary input voltage 4 Vrms
- Spring loaded connection

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1127 uncoated 130B1227 coated				●	●



VLT® Relay Option MCB 105

Makes it possible to extend relay functions with 3 additional relay outputs.

Max. terminal load:

- AC-1 Resistive load 240 V AC 2 A
- AC-15 Inductive load @cos fi 0.4 240 V AC 0.2 A
- DC-1 Resistive load 24 V DC 1 A
- DC-13 Inductive load @cos fi 0.4 24 V DC 0.1 A

Min. terminal load:

- DC 5 V 10 mA
- Max switch rate at rated load/min. load 6 min⁻¹/20 sec⁻¹
- Protects control cable connection
- Spring-loaded control wire connection

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1110 uncoated 130B1210 coated	●	●	●	●	●



VLT® Safe PLC I/O MCB 108

The VLT® AutomationDrive FC 302 provides a safety input based on a single pole 24 V DC input.

- For the majority of applications this input enables the user to implement safety in a cost-effective way. For application that works with more advanced products like Safety PLC, Lightcurtains etc. the Safe PLC interface enables the connection of a two wire safety link

- The Safe PLC Interface allows the Safe PLC to interrupt on the plus or the minus link without interfering the sense signal of the Safe PLC

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1120 uncoated 130B1220 coated	●	●	●	●	●



VLT® Analog I/O Option MCB 109

This analogue input/output option is easily fitted in the frequency converter for upgrading to advanced performance and control using the additional in/outputs. This option also upgrades the frequency converter with a battery back-up supply for the frequency converter's built-in clock. This provides stable use of all frequency converter clock functions as timed actions etc.

- 3 analogue inputs, each configurable as both voltage and temperature input
- Connection of 0-10 V analogue signals as well as PT1000 and NI1000 temperature inputs
- 3 analogue outputs each configurable as 0-10 V outputs
- Incl. back-up supply for the standard clock function in the frequency converter

The back-up battery typically lasts for 10 years, depending on environment.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1143 uncoated 130B1243 coated	●	●	●		



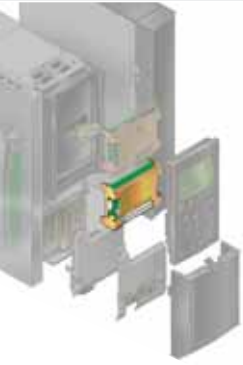
VLT® PTC Thermistor Card MCB 112

With the VLT® PTC Thermistor Card MCB 112, the VLT® AutomationDrive FC 302 enables improved surveillance of the motor condition compared to the built-in ETR function and thermistor terminal.

- Protects the motor from overheating
- ATEX approved for use with Ex d and Ex e motors (EX e only FC302)
- Uses Safe Stop function, which is approved in accordance with SIL 2 IEC 61508

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
NA uncoated 130B1137 coated	●		●		●

Slot B



VLT® Sensor Input Card MCB 114

The option protects the motor from being overheated by monitoring the bearings and windings temperature in the motor. Both limits as well as action are adjustable, and the individual sensor temperature is visible as a read-out on the display or by fieldbus.

- Protects the motor from overheating
- Three self-detecting sensor inputs for 2 or 3 wire PT100/PT1000 sensors
- One additional analogue input 4-20mA

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1172 uncoated 130B1272 coated	●		●	●	●



VLT® Safe Option MCB 140 Series

VLT® Safe Option MCB 140 Series are safety options providing Safe Stop 1 (SS1), Safely Limited Speed (SLS) and Safe Speed Monitor (SSM) functionality. The options can be used up to PL e according to ISO 13849-1.

MCB140 is a standard B-Option while MCB141 offers the same functionality in an external 45 mm housing. MCB141 enables the user to use the MCB140 functionality also if another B-Option is used.

Different operating modes can be easily configured by using the on board display and buttons. The options provide only a limited set of parameters for easy and fast parameterization.

- MCB140 standard B-Option
- MCB141 external Option
- Single channel or dual channel operation possible
- Proximity switch as speed feedback
- SS1, SLS and SMS functionality
- Easy and fast parameterization

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B6443 MCB 140 130B6447 MCB 141	●	●	●	●	●



VLT® Safe Option MCB 150 Series

The VLT® Safe Option MCB 150 Series expands the Safe Torque Off STO function, which is integrated in a standard VLT® AutomationDrive. By using the Safe Stop 1 function it is possible to perform a controlled stop before removing torque. Using the Safely Limited Speed SLS function it is also able to monitor whether a specified speed is exceeded. The functions can be used up to PL d according to EN ISO 13849 and SIL 2 according to IEC 61508.

- Additional standards-compliant safety functions
- Replacement of external safety equipment
- Reduced space requirements
- 2 safe programmable inputs
- 1 safe output (for T37)
- Easier machine certification
- Drive can be powered continuously
- Safe LCP Copy
- Dynamic commissioning report

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B3280 MCB 150 130B3290 MCB 151					●



VLT® Extended Cascade Controller MCO 101

Easily fitted and upgrades the built-in cascade controller to operate more pumps and more advanced pump control in master/follower mode.

- Up to 6 pumps in standard cascade setup
- Up to 5 pumps in master/follower setup
- Technical specifications: See MCB 105 Relay Option

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1118 uncoated 130B1218 coated			●		



VLT® Advanced Cascade Controller MCO 102

Easy to fit, the VLT® Advanced Cascade Controller MCO 102 upgrades the built-in cascade controller to operate up to 8 pumps and more advanced pump control in master/follower mode.

The same cascade controller hardware goes for the entire power range up to 1.2 MW.

- Up to 8 pumps in standard cascade setup
- Up to 8 pumps in master/follower setup

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1154 uncoated 130B1254 coated			●		

VLT® Motion Control MCO 305

An integrated programmable motion controller for VLT® AutomationDrive FC 301 and FC 302. The option adds functionality and flexibility to the already very comprehensive standard functionality of these drives.

VLT® Motion Control MCO 305 is optimised for all types of positioning and synchronising applications.

- Synchronisation (electronic shaft), positioning and electronic cam control
- 2 inputs supporting both incremental and absolute encoders
- 1 encoder output (virtual master function)
- 10 digital inputs
- 8 digital outputs
- Send and receive data via fieldbus interface (requires fieldbus option)
- PC software tools for programming and commissioning

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1134 uncoated 130B1234 coated				●	●



VLT® Extended Relay Card MCB 113

The VLT® Extended Relay Card MCB 113 adds inputs/outputs to VLT® AutomationDrive for increased flexibility.

- 7 digital inputs
- 2 analogue outputs
- 4 SPDT relays
- Meets NAMUR recommendations
- Galvanic isolation capability

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1164 uncoated 130B1264 coated				●	●



Slot C



VLT® Synchronizing Controller MCO 350

The VLT® Synchronizing Controller MCO 350 for VLT® AutomationDrive expands the functional properties of the converter in synchronising applications, and replaces traditional mechanical solutions.

- Displays actual synchronising error on frequency converter control panel
- Speed synchronising
- Position (angle) synchronising with or without marker correction
- On-line adjustable gear ratio
- On-line adjustable position (angle) offset
- Encoder output with virtual master function for synchronisation of multiple followers
- Homing

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1152 uncoated 130B1252 coated				●	●



VLT® Position Controller MCO 351

The VLT® Position Controller MCO 351 offers a host of user-friendly benefits for positioning applications in many industries. They are based on a range of thought-through and innovative features.

- Direct positioning via Fieldbus
- Relative positioning
- Absolute positioning
- Touch probe positioning
- End limit handling (software and hardware)
- Mechanical brake handling (programmable hold delay)
- Error handling
- Jog speed/manual operation
- Marker related positioning
- Home function

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1153 uncoated 130B1253 coated				●	●

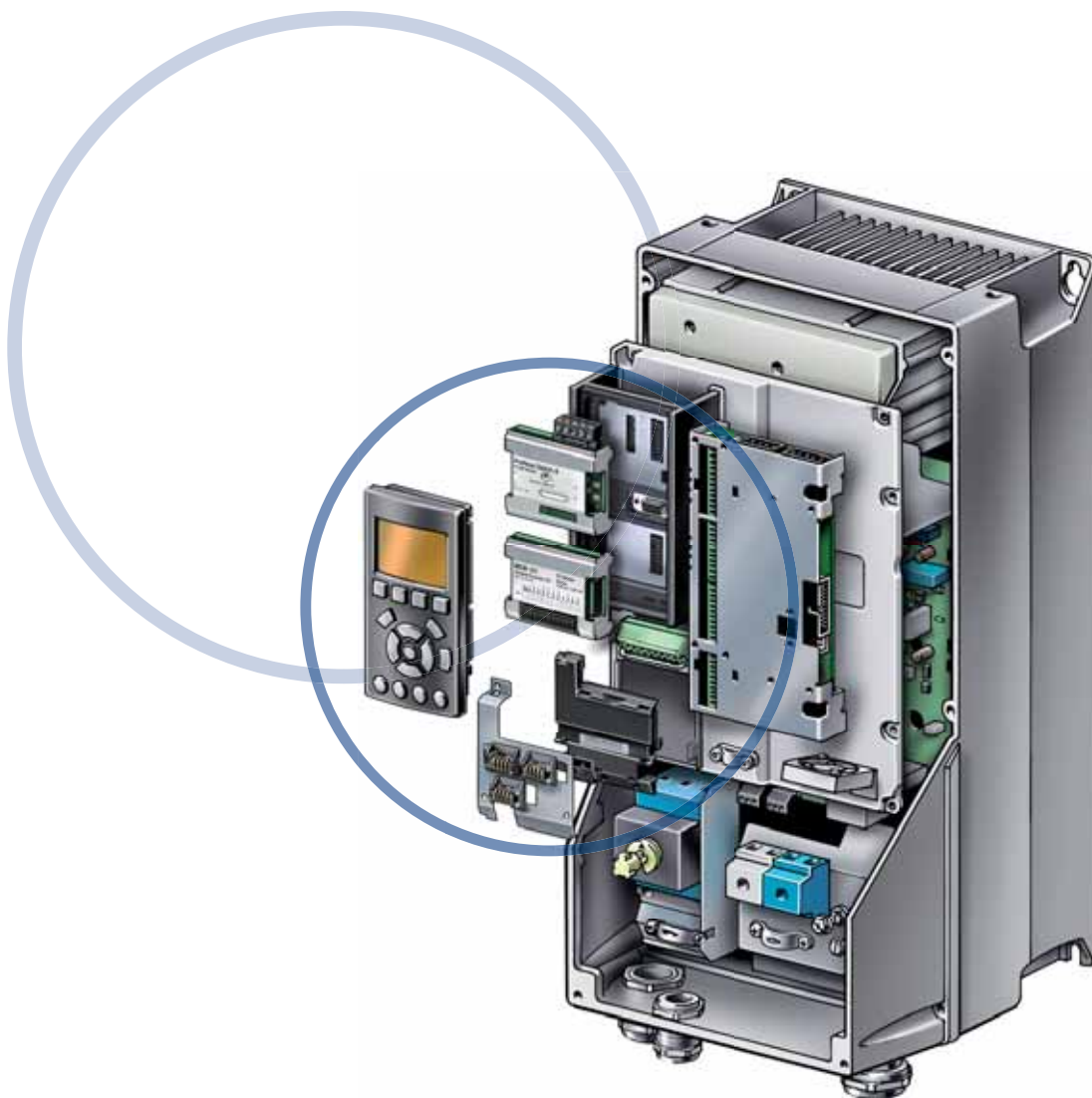
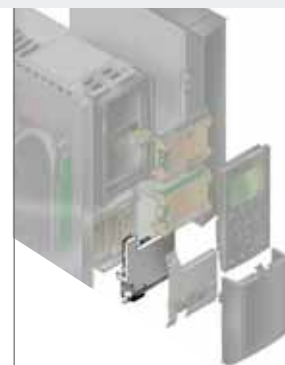


VLT® 24 V DC Supply MCB 107

The option is used to connect an external DC supply to keep the control section and any installed option alive during power failure.

- Input voltage range...24 V DC +/- 15% (max. 37 V in 10 sec.)
- Max. input current 2.2 A
- Max. cable length 75 m
- Input capacitance load < 10 uF
- Power-up delay < 0.6 s

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® Automation Drive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1108 uncoated	●	●	●	●	●
130B1208 coated	●	●	●	●	●





VLT® Control Panel LCP 102

- Multi-language display
- Status messages
- Quick menu for easy commissioning
- Parameter setting and explanation of parameter function
- Adjusting of parameters
- Full parameter backup and copy function
- Alarm logging
- Info button – explains the function of the selected item on display
- Hand-operated start/stop, or Automatic mode selection
- Reset function
- Trend graph

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1107	●	●	●	●	●



VLT® Control Panel LCP 101

The numerical control panel offers an excellent MMI interface to the drive.

- Status messages
- Quick menu for easy commissioning
- Parameter setting and adjusting
- Hand-operated start/stop function or Automatic mode select
- Reset function

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1124	●		●	●	●



LCP Panel Mounting Kit

All ordering numbers are for IP55/66 and include fasteners and a gasket.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1113 With fasteners, gasket, graphical LCP and 3 m cable	●	●	●	●	●
130B1114 With fasteners, gasket, numerical LCP and 3 m cable	●		●	●	●
130B1117 With fasteners, gasket and without LCP and with 3 m cable	●	●	●	●	●
130B1129 With fasteners, gasket, blind cover and 8 m "free end" cable	●	●	●	●	●
130B1170 With fasteners, gasket and without LCP and with 3 m cable	●	●	●	●	●

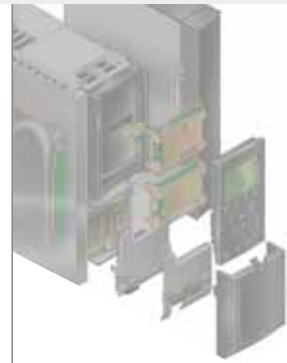


VLT® Brake Resistor MCE 101

Energy generated during braking is absorbed by the resistors, protecting electrical components from heating up. Danfoss brake resistors are optimized for the FC-series and general versions for horizontal and vertical applications are available.

- Enclosure protection as IP20 and up to IP65
- Build-in thermo switch
- Versions for vertical and horizontal mounting
- UL-recognized – only types for vertical mounting

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
See relevant Design Guide	●	●	●	●	●



VLT® Advanced Harmonic Filter AHF 005/010

Easy, effective harmonic distortion reduction by connecting the AHF 005/010 harmonic filter in front of a Danfoss frequency converter.

- AHF 005 reduces total harmonic current distortion to 5%
- AHF 010 reduces total harmonic current distortion to 10%

- Small compact housing that fits into a panel
- Easy to use in retrofit applications
- User-friendly start-up – no adjustment necessary
- No routine maintenance required
- VLT® FC family look

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
See relevant Design Guide	●	●	●	●	●



VLT® Sine-Wave Filters MCC 101

Sine-wave filters are placed between the frequency converter and the motor to optimise the motor power current. It provides a sinusoidal phase-to-phase motor voltage. The filters reduce motor insulation stress, acoustic noise from the motor, and bearing currents (especially in large motors).

- Reduce motor insulation stress
- Reduce acoustic noise from the motor
- Reduce bearing currents (especially in large motors)
- Reduce losses in the motor
- Prolongs service lifetime
- VLT® FC family look

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
See relevant Design Guide	●	●	●	●	●



VLT® dU/dt filter MCC 102

VLT® dU/dt filters are placed between the frequency converter and the motor to eliminate very fast voltage changes. The motor terminal phase-to-phase voltage is still pulse shaped but its dU/dt values are reduced.

- These filters reduce stress on the motor's insulation and are recommended in applications with older motors, aggressive environments or frequent braking which cause increased DC link voltage.
- VLT® FC family look

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
See relevant Design Guide	●	●	●	●	●

Accessories



For use with option A

Profibus SUB-D9 Adapter

In some industries, the use of SUB-D9 connectors is used as standard. The Profibus SUB-D9 Adapter allows the use of this connectors

throughout all installed devices. Use of SUB-D9 cabling allow easy access for diagnose tools and programming devices.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1112	●	●*	●	●	●

* Expected release in Q3, 2013



Adapter Plate for VLT® 3000 and VLT® 5000

For installations, where VLT3000 or VLT5000 has to be exchanged with the new FC series, the Adapter plates are a perfect solution. They has the same physical mounting as the VLT3/5000, which mean that no new holes has

to be drilled, with risk of getting shavings into electronic. In some cases even two FC's can be mounted, where there in the past was only one VLT mounted.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B0524 To be used only for IP 20/NEMA type 1 units up to 7.5 kW	●		●	●	●



VLT® B in C Option Adapter MCF 106

The B in C Option Adapter can be placed in the Option C slot and allows for combination of two different B options - either by placing both in the MCF 106 or by placing one in the standard slot B of the Control Card and one in the MCF 106.

VLT® Relay Card MCB 105 and VLT® PTC Thermistor Card MCB 112 are not supported by the adapter and must thus only be installed in the standard slot B of the Control Card.

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1130 uncoated 130B1230 coated	●		●	●	●



VLT® Common Mode Filters

Common mode filters are placed between the frequency converter and the motor. They are nano-crystalline cores that mitigate high frequency noise in the motor cable (shielded or unshielded) and reduce bearing currents in the motor.

- Extend motor bearing lifetime

- Can be combined with du/dt and sine-wave filters
- Reduce radiated emissions from the motor cable
- Easy to install – no adjustments necessary
- Oval shaped – allows mounting inside the frequency converter enclosure or motor terminal box
- No maintenance required

Ordering number	Frame size	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® AutomationDrive	
		FC 102	FC 103	FC 202	FC 301	FC 302
130B3257 130B3258 130B3259 130B3260	A and B C D E and F	●	●	●	●	●



USB extension

USB extension for IP 55 and IP 66 enclosures. Makes the USB connector available outside the drive. The USB extension is designed for mounting in a cable gland in the bottom of the drive, which makes PC communication very easy even in drives with high IP rating.

USB extension for A5-B1 enclosures,
350 mm cable 130B1155
USB extension for B2-C enclosures,
650 mm cable 130B1156

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® Automation Drive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1155 350 mm cable	●	●	●	●	●
130B1156 650 mm cable	●	●	●	●	●

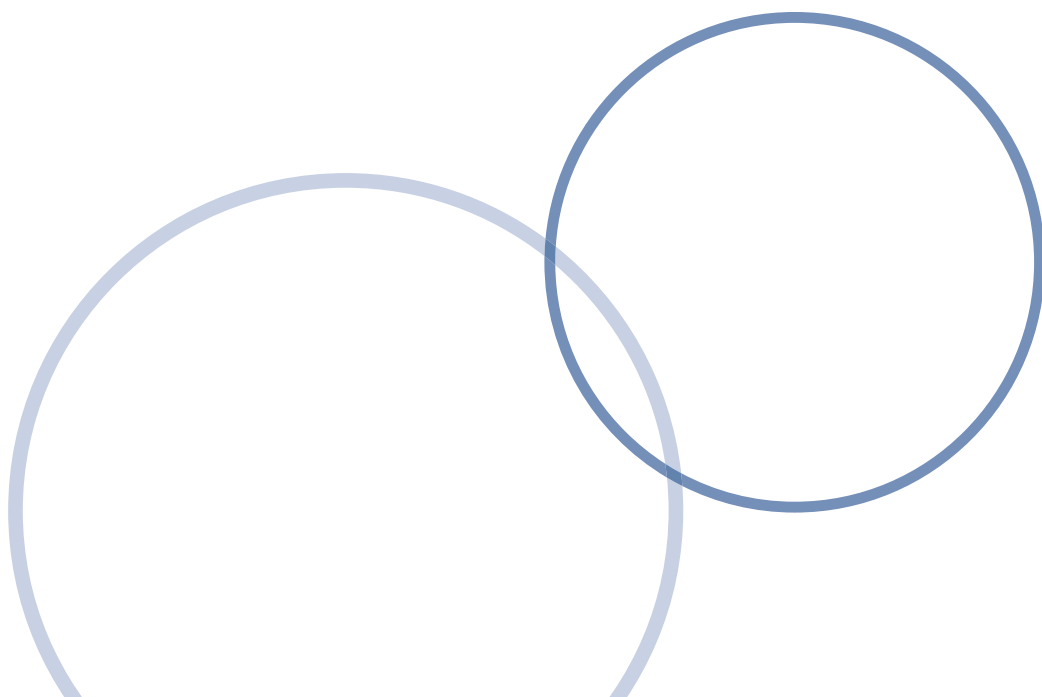


IP 21/Type 1 (NEMA1) Kit

The IP 21/Type 1 (NEMA1) kit is used for installation of VLT® drives in dry environments. The enclosure kits are available for frame sizes A1, A2, A3, B3, B4, C3 and C4

- Supports VLT® drives from 1.1 to 90 (NO) kW
- Used on standard VLT® drive with or without mounted option modules
- IP 41 on top side
- PG 16 and PG 21 holes for glands

Ordering number	VLT® HVAC Drive	VLT® Refrigeration Drive	VLT® AQUA Drive	VLT® Automation Drive	
	FC 102	FC 103	FC 202	FC 301	FC 302
130B1121 For frame size A1				●	●
130B1122 For frame size A2	●	●	●	●	●
130B1123 For frame size A3	●	●	●	●	●
130B1187 For frame size B3	●	●	●	●	●
130B1189 For frame size B4	●	●	●	●	●
130B1191 For frame size C3	●	●	●	●	●
130B1193 For frame size C4	●	●	●	●	●





What VLT® is all about

Danfoss VLT Drives is the world leader among dedicated drives providers – and still gaining market share.

Environmentally responsible

VLT® products are manufactured with respect for the safety and well-being of people and the environment.

All frequency converter factories are certified according to ISO 14001 and ISO 9001 standards.

All activities are planned and performed taking into account the individual employee, the work environment and the external environment. Production takes place with a minimum of noise, smoke or other pollution and environmentally safe disposal of the products is pre-prepared.

UN Global Compact

Danfoss has signed the UN Global Compact on social and environmental responsibility and our companies act responsibly towards local societies.

Impact on energy savings

One year's energy savings from our annual production of VLT® drives will save the energy equivalent to the energy production from a major power plant. Better process control at the same time improves product quality and reduces waste and wear on equipment.

Dedicated to drives

Dedication has been a key word since 1968, when Danfoss introduced the world's first mass produced variable speed drive for AC motors – and named it VLT®.

Twenty five hundred employees develop, manufacture, sell and service drives and soft starters in more than one hundred countries, focused only on drives and soft starters.

Intelligent and innovative

Developers at Danfoss VLT Drives have fully adopted modular principles in development as well as design, production and configuration.

Tomorrow's features are developed in parallel using dedicated technology platforms. This allows the development of all elements to take place in parallel, at the same time reducing time to market and ensuring that customers always enjoy the benefits of the latest features.

Rely on the experts

We take responsibility for every element of our products. The fact that we develop and produce our own features, hardware, software, power modules, printed circuit boards, and accessories is your guarantee of reliable products.

Local backup – globally

VLT® motor controllers are operating in applications all over the world and Danfoss VLT Drives' experts located in more than 100 countries are ready to support our customers with application advice and service wherever they may be.

Danfoss VLT Drives experts don't stop until the customer's drive challenges are solved.



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