■ Contents

■ Why choose Danfoss?

Danfoss manufactured the world's first mass-produced frequency converter back in 1968. We have set the standard for quality drives ever since. That is why our VLT frequency converters are today sold and serviced in more than 100 countries covering six continents.

With the new VLT 5000 Series, we are introducing VVC^{plus}. This is our new Sensorless Vector Drive System for torque and speed control of induction motors.

If compared with a standard voltage/frequency ratio control, VVC ^{plus} offers improved dynamics and stability, both when the speed reference and the load torque are changed. We have implemented a fully digitalised protection concept, which ensures reliable operation, even under the worst possible operating conditions. Naturally, the VLT 5000 Series also offers full protection against short-circuiting, earthing fault and overload.

Danfoss drives with the VVC^{plus} control system tolerate load shocks throughout their speed range and react swiftly to changes in reference.

However, it must also be easy to reach this performance. Danfoss is convinced that high-technology drives can be made user-friendly. The VLT 5000 Series proves us right. In order to make programming simple and easy-to-grasp, we have divided the parameters into different groups. The Quick menu guides users quickly through the programming of the few parameters that must be set to get started. The control panel is detachable. It features a four-line alpha-numeric display, enabling four measuring values to be displayed at the same time. Via the detachable control panel, the programmed settings can be copied from one VLT frequency converter to the next. This means that there is no time to be spent on programming when changing drives or integrating an extra drive in the installation.

The entire programming process is easier than ever before. The VLT 5000 Series makes most adjustments automatically.

If you have any questions concerning VLT frequency converters, please call us. We have drive specialists all over the world ready to advise you on applications, programming, training and service.

■ Available literature

Below is a list of the literature available for VLT 5000. It must be noted that there may be deviations from one country to another.

Supplied with the unit:

Operating instructions	MG.51.AX.YY
High Power Installation Guide	MI.90.JX.YY

Communication with VLT 5000:

VLT 5000 Profibus manual	MG.10.EX.YY
VLT 5000 DeviceNet manual	MG.50.HX.YY
VLT 5000 LonWorks manual	MG.50.MX.YY
VLT 5000 Modbus manual	MG.10.MX.YY
VLT 5000 Interbus manual	MG.10.OX.YY

Application options for VLT 5000:

VLT 5000 SyncPos option manual	MG.10.EX.YY
VLT 5000 Positioning controller manual	MG.50.PX.YY
VLT 5000 Synchronising controller manual	MG.10.NX.YY
Ring spinning option	MI.50.ZX.02
Wobble function option	MI.50.JX.02
Winder and Tension control option	MG.50.KX.02

Instructions for VLT 5000:

Loadsharing	MI.50.NX.02
VLT 5000 Brake resistors	MI.90.FX.YY
Brake resistors for horizontal applications (VLT 5001 - 5011) (Only in English and German)	MI.50.SX.YY
LC filter modules	MI.56.DX.YY
Converter for encoder inputs (5V TTL to 24 V DC) (Only in combined English/German)	MI.50.IX.51
Back Plate to VLT 5000 Series	MN.50.XX.02

Various literature for VLT 5000:

Design Guide	MG.51.BX.YY
Incorporating a VLT 5000 Profibus in a Simatic S5 system	MC.50.CX.02
Incorporating a VLT 5000 Profibus in a Simatic S7 system	MC.50.AX.02
Hoist and the VLT 5000 series	MN.50.RX.02

Miscellaneous (only in English):

Protection against electrical hazards	MN.90.GX.02
Choice of prefuses	MN.50.OX.02
VLT on IT mains	MN.90.CX.02
Filtering of harmonic currents	MN.90.FX.02
Handling aggressive environments	MN.90.IX.02
CI-TI™ contactors - VLT® frequency converters	MN.90.KX.02
VLT® frequency converters and UniOP operator panels	MN.90.HX.02

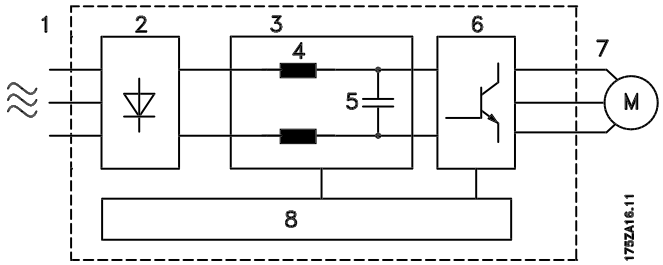
X = version number
YY = language version

■ Technology

■ Control principle

A frequency converter rectifies AC voltage from mains into DC voltage, after which this DC voltage is converted into a AC current with a variable amplitude and frequency.

The motor is thus supplied with variable voltage and frequency, which enables infinitely variable speed control of three-phased, standard AC motors.



1. Mains voltage
3 x 200 - 240 V AC, 50 / 60 Hz.
3 x 380 - 500 V AC, 50 / 60 Hz.
3 x 525 - 600 V AC, 50 / 60 Hz.
3 X 525 - 690 V AC, 50 / 60 Hz.

2. Rectifier
A three-phase rectifier bridge that rectifies AC current into DC current.

3. Intermediate circuit
DC voltage = 1.35 x mains voltage [V].

4. Intermediate circuit coils
Smooth the intermediate circuit current and limit the load on mains and components (mains transformer, wires, fuses and contactors).

5. Intermediate circuit capacitors
Smooth the intermediate circuit voltage.

6. Inverter
Converts DC voltage into variable AC voltage with a variable frequency.

7. Motor voltage
Variable AC voltage, 0-100% of mains supply voltage.
Variable frequency: 0.5-132/0.5-1000 Hz.

8. Control card
This is where to find the computer that controls the inverter which generates the pulse pattern by which the DC voltage is converted into variable AC voltage with a variable frequency.

VVC^{plus} control principle
The frequency converter features an inverter control system called VVC^{plus}, which is a further development of the Voltage Vector Control (VVC) known i.e. from Danfoss VLT 3000 Series.

VVC^{plus} controls an induction motor by energizing it with a variable frequency and a voltage that matches it. If the motor load is changed, the magnetisation of the motor changes too, and so does its speed. Consequently, the motor current is measured continuously and the actual voltage requirement and slip of the motor are calculated from a motor model. Motor frequency and voltage are adjusted to ensure that the motor operating point remains optimum under varying conditions.

The development of the VVC^{plus} principle is the result of a wish to maintain robust, sensorless regulation that is tolerant to different motor characteristics without motor derating being required.

First and foremost, the current measurement and the motor model have been improved. The current is split into magnetising and torque-generating parts and provides for much better and quicker estimation of the actual motor loads. It is now possible to compensate for rapid load changes. Full torque as well as extremely accurate speed control can now be obtained even at low speeds or even at standstill.

In a "special motor mode", permanent magnet synchronous motors and/or parallel motors can be used.

Good torque control properties, smooth transitions to and from current limit operation and robust pull-out torque protection are ensured.

After automatic motor adaptation, VVC^{plus} will help to ensure extremely accurate motor control.

Advantages of the VVC^{plus} control system:
- Accurate speed control, now even at low speed
- Quick response from received signal to full motor shaft torque
- Good compensation for step loads
- Controlled transition from normal operation to current limit operation (and vice versa)
- Reliable pull-out torgue protection throughout the speed range, also in the case of field weakening
- Great tolerance towards varying motor data
- Torque control, comprising control of both the torque-generating and the magnetising component of the current
- Full holding torque (closed loop)

As standard, the frequency converter comes with a number of integral components that would normally have to be acquired separately. These integral components (RFI filter, DC coils, screen clamps and serial communication port) are space-savers that simplify installation, since the frequency converter fulfills most requirements without any supplementary components.

Programmable control inputs and signal outputs in four Setups

The frequency converter uses a digital technique which makes it possible to program the different control inputs and signal outputs and to select four different user-defined Setups for all parameters.

For the user, it is easy to program the desired functions by means of the control panel on the frequency converter or the RS 485 user interface.

Protection against mains interference
The frequency converter is protected against the transients that occur in the mains supply, e.g. when switching power factor correction or when fuses blow.

The rated motor voltage and full torque can be maintained all the way down to 10% undervoltage in the mains supply.

Minor interference on mains
Since as standard the frequency converter features intermediate circuit coils, there is only a small amount of harmonic mains supply interference. This ensures a good power factor and lower peak current, which reduces the load on the mains installation.

Advanced VLT protection
Current measurement on all three motor phases provides perfect protection of the frequency converter against earthing and short-circuiting faults on the motor connection.

Constant monitoring of all three motor phases enables switching on the motor output, e.g. by means of a contactor.

Efficient monitoring of the three mains supply phases ensures that the unit stops in the case of phase failure. This avoids overloading the inverter and the capacitors in the intermediate circuit, which would dramatically reduce the service life of the frequency converter.

As standard, the frequency converter features integral thermal protection. If a situation of thermal overload occurs, this function cuts out the inverter.

Reliable galvanic isolation
In the frequency converter, all control terminals as well as terminals 1-5 (AUX relays) are supplied by or connected to circuits that comply with PELV requirements in relation to the mains potential.

Advanced motor protection
The frequency converter features integrated electronic, thermal motor protection.

The frequency converter calculates the motor temperature on the basis of current, frequency and time.

As opposed to the traditional bimetallic protection, electronic protection takes account of the reduction in cooling at low frequencies that comes from reduced fan speed (motors with internal ventilation).

Thermal motor protection is comparable to a normal motor thermistor.

To obtain maximum protection against overheating of the motor if the motor is covered or blocked, or if the fan fails, a thermistor can be integrated and connected to the thermistor input of the frequency converter (terminals 53/54), see parameter 128 of the Operating Instructions.

■ How to select your frequency converter

A frequency converter must be selected on the basis of the given motor current at maximum load on the unit. The rated output current $I_{VLT,N}$ must be equal to or higher than the required motor current.

The frequency converter is supplied for four mains voltage ranges: 200-240 V, 380-500 V, 525-600 V and 525-690 V..

■ Normal/high overload torque mode

This function enables the frequency converter to perform a constant 100% torque, using an oversize motor. The choice between a normal or a high overload torque characteristic is made in parameter 101.

This is also where to choose between a high/normal constant torque characteristic (CT) or a high/normal VT torque characteristic.

If a *high torque characteristic* is chosen, a rated motor with the frequency converter obtains up to 160% torque for 1 min. in both CT and VT.

If a *normal torque characteristic* is chosen, an oversize motor allows up to 110% torque performance for up to 1 min. in both CT and VT. This function is used mainly for pumps and fans, since these applications do not require an overload torque.

The advantage of choosing a normal torque characteristic for an oversize motor is that the frequency converter will be able constantly to yield 100% torque, without derating as a result of a bigger motor.

NB!:
This function cannot be chosen for VLT 5001-5006, 200-240 Volts, and VLT 5001-5011, 380-500 Volts.

■ Type code ordering number string

The VLT 5000 series frequency converter is offered in a large number of variants. On the basis of your order, the frequency converter is given an ordering number that can be seen from the nameplate on the unit. The number may look as follows:

VLT5008PT5B20EBR3DLF10A10C0

This means that the frequency converter is configured as a:

- 5,5 kW unit at 160% torque (Position 1-7 - VLT 5008)
- Process control card (Position 8 - P)
- 380-500 V three phase supply (Position 9-10 - T5)
- Bookstyle IP20 enclosure (Position 11-13 - B20)
- Extended hardware version with brake (Position 14-15 - EB)
- Built in RFI filter (Position 16-17 - R3)
- Supplied with display (Position 18-19 - DL)
- Built in Profibus option (Position 20-22 - F10)
- Built in programmable SyncPos controller (Position 23-25 - A10)
- Uncoated printed circuit boards (Position 26-27 - C0)

Variants and options possible

In the following you will find an overview of possible variants that can be put together. Please refer to the description of the designation below.

VLT 5001-5052, 200-240 V units
Typecode designation: T2

Powersize (kW)		Type	Enclosure					HW variant			RFI filter		
Torque			C00	B20	C20	CN1	C54	ST	SB	EB	R0	R1	R3
110%	160%												
		9-10	11-13	11-13	11-13	11-13	11-13	14-15	14-15	14-15	16-17	16-17	16-17
0.75		5001		x	x		x	x	x	x			x
1.1		5002		x	x		x	x	x	x			x
1.5		5003		x	x		x	x	x	x			x
2.2		5004		x	x		x	x	x	x			x
3		5005		x	x		x	x	x	x			x
3.7		5006		x	x		x	x	x	x		x	
7.5	5.5	5008			x		x	x	x	x	x		x
11	7.5	5011			x		x	x	x	x	x		x
15	11	5016			x		x	x	x	x	x		x
18.5	15	5022			x		x	x	x	x	x		x
22	18.5	5027			x		x	x	x	x	x		x
30	22	5032	x			x	x	x	x	x	x	x	
37	30	5042	x			x	x	x	x	x	x	x	
45	37	5052	x			x	x	x	x	x	x	x	

C00	Compact IP00	DE	Extended with brake, disconnect and fuses
B20	Bookstyle IP20	DX	Extended without brake, with disconnect and fuses
C20	Compact IP20	PS	Standard with 24 V supply
CN1	Compact Nema1	PB	Standard with 24 V supply, brake, fuse and disconnect
C54	Compact IP54	PD	Standard with 24 V supply, fuse and disconnect
ST	Standard	PF	Standard with 24 V supply and fuse
SB	Standard with brake	R0	Without filter
EB	Extended with brake	R1	Class A1 filter
EX	Extended without brake	R3	Class A1 and B filter

VLT 5001-5552, 380-500 V units

Typecode designation: T5

Powersize (kW)		Type	Enclosure					HW variant										RFI filter			
Torque			C00	B20	C20	CN1	C54	ST	SB	EB	EX	DE	DX	PS	PB	PD	PF	R0	R1	R3	R6
110%	160%																				
		9-10	11-13	11-13	11-13	11-13	11-13	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	16-17	16-17	16-17	16-17
0.75		5001		x	x		x	x	x	x										x	
1.1		5002		x	x		x	x	x	x										x	
1.5		5003		x	x		x	x	x	x										x	
2.2		5004		x	x		x	x	x	x										x	
3		5005		x	x		x	x	x	x										x	
3.7		5006		x	x		x	x	x	x										x	
5.5		5008		x	x		x	x	x	x										x	
7.5		5011		x	x		x	x	x	x									x		
15	11	5016			x		x	x	x	x								x		x	
18.5	15	5022			x		x	x	x	x								x		x	
22	18.5	5027			x		x	x	x	x								x		x	
30	22	5032			x		x	x	x	x								x		x	
37	30	5042			x		x	x	x	x								x		x	
45	37	5052			x		x	x	x	x								x		x	
55	45	5062			x		x	x	x	x								x		x	
75	55	5072			x		x	x	x	x								x		x	
90	75	5102			x		x	x	x	x								x		x	
110	90	5122	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
132	110	5152	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
160	132	5202	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
200	160	5252	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
250	200	5302	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
315	250	5352	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		
355	315	5452	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		
400	355	5502	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		
450	400	5552	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		

C00	Compact IP00
B20	Bookstyle IP20
C20	Compact IP20
CN1	Compact Nema1
C54	Compact IP54
ST	Standard
SB	Standard with brake
EB	Extended with brake
EX	Extended without brake

DE	Extended with brake, disconnect and fuses
DX	Extended without brake, with disconnect and fuses
PS	Standard with 24 V supply
PB	Standard with 24 V supply, brake, fuse and disconnect
PD	Standard with 24 V supply, fuse and disconnect
PF	Standard with 24 V supply and fuse
R0	Without filter
R1	Class A1 filter
R3	Class A1 and B filter
R6	Filter for marine installations

VLT 5001-5062, 525-600 V units
Typecode designation: T6

Powersize (kW)		Type	Enclosure			HW variant		RFI filter
Torque			C00	C20	CN1	ST	EB	R0
110%	160%							
		9-10	11-13	11-13	11-13	14-15	14-15	16-17
1.1	0.75	5001		x		x	x	x
1.5	1.1	5002		x		x	x	x
2.2	1.5	5003		x		x	x	x
3.0	2.2	5004		x		x	x	x
4.0	3.0	5005		x		x	x	x
5.5	4.0	5006		x		x	x	x
7.5	5.5	5008		x		x	x	x
7.5	7.5	5011		x		x	x	x
15	11	5016		x		x	x	x
18.5	15	5022		x		x	x	x
22	18.5	5027		x		x	x	x
30	22	5032		x		x	x	x
37	30	5042		x		x	x	x
45	37	5052		x		x	x	x
55	45	5062		x		x	x	x

VLT 5042-5352, 525-690 V units
Typecode designation: T7

Power size (kW)		Type	Enclosure			Hardware variant										RFI filter	
Torque			C00	CN1	C54	ST	SB	EB	EX	DE	DX	PS	PB	PD	PF	R0	R1[1]
110%	160%																
		9-10	11-13	11-13	11-13	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	16-17	16-17
45	37	5042	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55	45	5052	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
75	55	5062	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
90	75	5072	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
110	90	5102	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
132	110	5122	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
160	132	5152	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
200	160	5202	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
250	200	5252	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
315	250	5302	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
400	315	5352	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

1. R1 is not available with DX, PF and PD variants.

Voltage (position 9-10)
The drives are available in three voltage ratings. Please be aware that some drives at 500 V supply match a motor power size larger than 400 V - please refer to the individual technical data.

- T2 - 200-240 V three phase supply voltage
- T5 - 380-500 V three phase supply voltage
- T6 - 525-600 V three phase supply voltage
- T7 - 525-690 V three phase supply voltage

Enclosure variants (position 11-13)
Bookstyle units are available for use in control cabinets - the slim design allows many units in one cabinet. Compact units are designed for mounting on walls or machines. Higher power units are also available as IP00 units for installation in control cabinets.

- C00 - Compact IP00 enclosure
- B20 - Bookstyle IP20 enclosure
- C20 - Compact IP20 enclosure
- CN1 - Compact Nema1 enclosure also fulfilling IP20/21 specifications
- C54 - Compact IP54 enclosure also fulfilling NEMA12 demands

Hardware variants (position 14-15)
The hardware variants differ depending on power size.

- ST - Standard hardware
- SB - Standard hardware and additional brake chopper
- EB - Extended hardware (24 V external supply for backup of control card and load sharing connections) and an additional brake chopper
- EX - Extended hardware (24 V external supply for backup of control card and load sharing connections)

- DE - Extended hardware (24 V external supply for backup of control card and load sharing connections), brake chopper, disconnect and fuses
- DX - Extended hardware (24 V external supply for backup of control card and load sharing connections), disconnect and fuses
- PS - Standard hardware with 24 V external supply for backup of control card
- PB - Standard hardware with 24 V external supply for backup of control card, brake chopper, fuse and disconnect option
- PD - Standard hardware with 24 V external supply for backup of control card, mains fuse and disconnect option
- PF - Standard hardware with 24 V external supply for backup of control card and built in main fuses

RFI filter variants (position 16-17)
Different RFI filter variants offer the possibility to comply with class A1 and class B according to EN55011.

- R0 - No filter performance specified
- R1 - Compliance with class A1 filter
- R3 - Compliance with class B and A1
- R6 - Compliance with marine approvals (VLT 5122-5302, 380-500 V)

Compliance depends on cable length. Please be aware that some power sizes always have built in filters from factory.

Display (position 18-19)
The control unit (display and keypad)
- D0 - No display in the unit (not possible for IP54 enclosures aswell as IP21 VLT 5352-5552, 380-480 V)
- DL - Display supplied with the unit

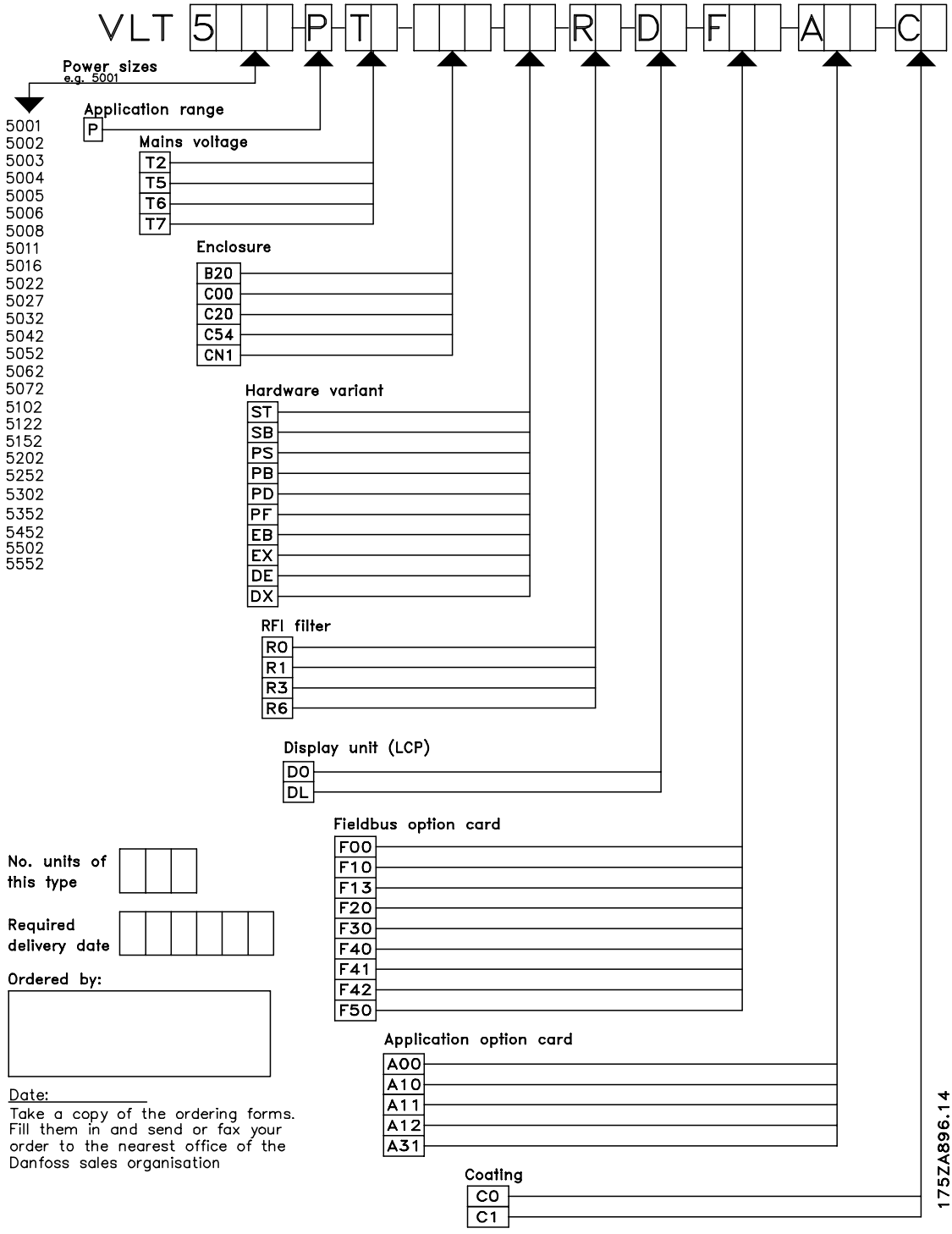
Field bus option (position 20-22)
A wide selection of high performance field bus options is available
- F0 - No field bus option built in
- F10 - Profibus DP V0/V1 12 Mbaud
- F13 - Profibus DP V0/FMS 12 Mbaud
- F20 - Modbus Plus
- F30 - DeviceNet
- F40 - LonWorks - Free topology
- F41 - LonWorks - 78 kbps
- F42 - LonWorks - 1,25 Mbps
- F50 - Interbus

Application options (position 23-25)
Several application options are available to enhance the functionality of the frequency converter
- A00 - No option built in
- A10 - SyncPos programmable controller (not possible with Modbus Plus and LonWorks)
- A11 - Synchronising controller (not possible with Modbus Plus and LonWorks)
- A12 - Positioning controller (not possible with Modbus Plus and LonWorks)
- A31 - Additional relays - 4 relays for 250 VAC (not possible with field bus options)

Coating (position 26-27)
To increase protection of the drive against aggressive environments it is possible to order coated printed circuit boards.

- C0 - Non coated boards (VLT 5352-5552, 380-500 V and VLT 5042-5352, 525-690 V) only available with coated boards)
- C1 - Coated boards

■ Ordering form VLT 5000 Series - Typecode



Product Range

■ General technical data

Mains supply (L1, L2, L3):

Supply voltage 200-240 V units	3 x 200/208/220/230/240 V ±10%
Supply voltage 380-500 V units	3 x 380/400/415/440/460/500 V ±10%
Supply voltage 525-600 V units	3 x 525/550/575/600 V ±10%
Supply voltage 525-690 V units	3 x 525/550/575/600/690 V ±10%
Supply frequency	48-62 Hz +/- 1 %

See the section on special conditions in the Design Guide

VLT output data (U, V, W):

Output voltage	0-100% of supply voltage
Output frequency VLT 5001-5027, 200-240 V	0-132 Hz, 0-1000 Hz
Output frequency VLT 5032-5052, 200-240 V	0-132 Hz, 0-450 Hz
Output frequency VLT 5001-5052, 380-500 V	0-132 Hz, 0-1000 Hz
Output frequency VLT 5062-5302, 380-500 V	0-132 Hz, 0-450 Hz
Output frequency VLT 5352-5552, 380-500 V	0-132 Hz, 0-300 Hz
Output frequency VLT 5001-5011, 525-600 V	0-132 Hz, 0-700 Hz
Output frequency VLT 5016-5052, 525-600 V	0-132 Hz, 0-1000 Hz
Output frequency VLT 5062, 525-600 V	0-132 Hz, 0-450 Hz
Output frequency VLT 5042-5302, 525-690 V	0-132 Hz, 0-200 Hz
Output frequency VLT 5352, 525-690 V	0-132 Hz, 0-150 Hz
Rated motor voltage, 200-240 V units	200/208/220/230/240 V
Rated motor voltage, 380-500 V units	380/400/415/440/460/480/500 V
Rated motor voltage, 525-600 V units	525/550/575 V
Rated motor voltage, 525-690 V units	525/550/575/690 V
Rated motor frequency	50/60 Hz
Switching on output	Unlimited
Ramp times	0.05-3600 sec.

Torque characteristics:

Starting torque, VLT 5001-5027, 200-240 V and VLT 5001-5552, 380-500 V	160% for 1 min.
Starting torque, VLT 5032-5052, 200-240 V	150% for 1 min.
Starting torque, VLT 5001-5062, 525-600 V	160% for 1 min.
Starting torque, VLT 5042-5352, 525-690 V	160% for 1 min.
Starting torque	180% for 0.5 sec.
Acceleration torque	100%
Overload torque, VLT 5001-5027, 200-240 V and VLT 5001-5552, 380-500 V, VLT 5001-5062, 525-600 V, and VLT 5042-5352, 525-690 V	160%
Overload torque, VLT 5032-5052, 200-240 V	150%
Arresting torque at 0 rpm (closed loop)	100%

The torque characteristics given are for the frequency converter at the high overload torque level (160%). At the normal overload torque (110%), the values are lower.

	Braking at high overload torque level		
	Cycle time (s)	Braking duty cycle at 100% torque	Braking duty cycle at over torque (150/160%)
200-240 V			
5001-5027	120	Continuous	40%
5032-5052	300	10%	10%
380-500 V			
5001-5102	120	Continuous	40%
5122-5252	600	Continuous	10%
5302	600	40%	10%
5352-5552	600	40%[1)]	10%[2)]
525-600 V			
5001-5062	120	Continuous	40%
525-690 V			
5042-5352	600	40%	10%

1) VLT 5502 at 90% torque. At 100% torque the braking duty cycle is 13%. At mains rating 441-500 V 100% torque the braking duty cycle is 17%.

VLT 5552 at 80% torque. At 100% torque the braking duty cycle is 8%.

2) Based on 300 second cycle:

For VLT 5502 the torque is 145%.

For VLT 5552 the torque is 130%.

Control card, digital inputs:

Number of programmable digital inputs 8
Terminal nos. 16, 17, 18, 19, 27, 29, 32, 33
Voltage level ..... 0-24 V DC (PNP positive logics)
Voltage level, logical '0' ..... < 5 V DC
Voltage level, logical '1' ..... >10 V DC
Maximum voltage on input ..... 28 V DC
Input resistance, R_i ..... 2 kΩ
Scanning time per input ..... 3 msec.

Reliable galvanic isolation: All digital inputs are galvanically isolated from the supply voltage (PELV). In addition, the digital inputs can be isolated from the other terminals on the control card by connecting an external 24 V DC supply and opening switch 4. VLT 5001-5062, 525-600 V do not meet PELV.

Control card, analogue inputs:

No. of programmable analogue voltage inputs/thermistor inputs 2
Terminal nos. 53, 54
Voltage level ..... 0 - ±10 V DC (scalable)
Input resistance, R_i ..... 10 kΩ
No. of programmable analogue current inputs 1
Terminal no. 60
Current range ..... 0/4 - ±20 mA (scalable)
Input resistance, R_i ..... 200 Ω
Resolution ..... 10 bit + sign
Accuracy on input ..... Max. error 1% of full scale
Scanning time per input ..... 3 msec.
Terminal no. ground 55

Reliable galvanic isolation: All analogue inputs are galvanically isolated from the supply voltage (PELV) as well as other inputs and outputs.*

** VLT 5001-5062, 525-600 V do not meet PELV.*

Control card, pulse/encoder input:

No. of programmable pulse/encoder inputs	4
Terminal nos.	17, 29, 32, 33
Max. frequency on terminal 17	5 kHz
Max. frequency on terminals 29, 32, 33	20 kHz (PNP open collector)
Max. frequency on terminals 29, 32, 33	65 kHz (Push-pull)
Voltage level	0-24 V DC (PNP positive logics)
Voltage level, logical '0'	< 5 V DC
Voltage level, logical '1'	>10 V DC
Maximum voltage on input	28 V DC
Input resistance, R_i	2 kΩ
Scanning time per input	3 msec.
Resolution	10 bit + sign
Accuracy (100-1 kHz), terminals 17, 29, 33	Max. error: 0.5% of full scale
Accuracy (1-5 kHz), terminal 17	Max. error: 0.1% of full scale
Accuracy (1-65 kHz), terminals 29, 33	Max. error: 0.1% of full scale

Reliable galvanic isolation: All pulse/encoder inputs are galvanically isolated from the supply voltage (PELV). In addition, pulse and encoder inputs can be isolated from the other terminals on the control card by connecting an external 24 V DC supply and opening switch 4.*

** VLT 5001-5062, 525-600 V do not meet PELV.*

Control card, digital/pulse and analogue outputs:

No. of programmable digital and analogue outputs	2
Terminal nos.	42, 45
Voltage level at digital/pulse output	0 - 24 V DC
Minimum load to ground (terminal 39) at digital/pulse output	600 Ω
Frequency ranges (digital output used as pulse output)	0-32 kHz
Current range at analogue output	0/4 - 20 mA
Maximum load to ground (terminal 39) at analogue output	500 Ω
Accuracy of analogue output	Max. error: 1.5% of full scale
Resolution on analogue output.	8 bit

Reliable galvanic isolation: All digital and analogue outputs are galvanically isolated from the supply voltage (PELV), as well as other inputs and outputs.*

** VLT 5001-5062, 525-600 V do not meet PELV.*

Control card, 24 V DC supply:

Terminal nos.	12, 13
Max. load (short-circuit protection)	200 mA
Terminal nos. ground	20, 39

Reliable galvanic isolation: The 24 V DC supply is galvanically isolated from the supply voltage (PELV), but has the same potential as the analogue outputs.*

** VLT 5001-5062, 525-600 V do not meet PELV.*

Control card, RS 485 serial communication:

Terminal nos.	68 (TX+, RX+), 69 (TX-, RX-)

Reliable galvanic isolation: Full galvanic isolation.

Relay outputs:[1)]

No. of programmable relay outputs	2
Terminal nos., control card (resistive load only)	4-5 (make)
Max. terminal load (AC1) on 4-5, control card	50 V AC, 1 A, 50 VA
Max. terminal load (DC1 (IEC 947)) on 4-5, control card	25 V DC, 2 A / 50 V DC, 1 A, 50 W
Max. terminal load (DC1) on 4-5, control card for UL/cUL applications	30 V AC, 1 A / 42.5 V DC, 1A
Terminal nos., power card (resistive and inductive load)	1-3 (break), 1-2 (make)
Max. terminal load (AC1) on 1-3, 1-2, power card	250 V AC, 2 A, 500 VA
Max. terminal load (DC1 (IEC 947)) on 1-3, 1-2, power card	25 V DC, 2 A / 50 V DC, 1A, 50 W
Min. terminal load (AC/DC) on 1-3, 1-2, power card	24 V DC, 10 mA / 24 V AC, 100 mA

1) Rated values for up to 300,000 operations.
At inductive loads the number of operations are reduced by 50%, alternatively the current can be reduced by 50%, thus the 300,000 operations are maintained.

Brake resistor terminals (only SB, EB, DE and PB units):

Terminal nos.	81, 82

External 24 Volt DC supply:

Terminal nos.	35, 36
Voltage range	24 V DC ±15% (max. 37 V DC for 10 sec.)
Max. voltage ripple	2 V DC
Power consumption	15 W - 50 W (50 W for start-up, 20 msec.)
Min. pre-fuse	6 Amp

Reliable galvanic isolation: Full galvanic isolation if the external 24 V DC supply is also of the PELV type.

Cable lengths, cross-sections and connectors:

Max. motor cable length, screened cable	150 m
Max. motor cable length, unscreened cable	300 m
Max. motor cable length, screened cable VLT 5011 380-500 V	100 m
Max. motor cable length, screened cable VLT 5011 525-600 V and VLT 5008, normal overload mode, 525-600 V	50 m
Max. brake cable length, screened cable	20 m
Max. loadsharing cable length, screened cable	25 m from frequency converter to DC bar.

Max. cable cross-section for motor, brake and loadsharing, see Electrical data

Max. cable cross-section for 24 V external DC supply

- VLT 5001-5027 200-240 V; VLT 5001-5102 380-500 V; VLT 5001-5062 525-600 V	4 mm^2 /10 AWG
- VLT 5032-5052 200-240 V; VLT 5122-5552 380-500 V; VLT 5042-5352 525-690 V	2.5 mm^2 /12 AWG
Max. cross-section for control cables	1.5 mm^2 /16 AWG
Max. cross-section for serial communication	1.5 mm^2 /16 AWG

If UL/cUL is to be complied with, copper cable with temperature class 60/75°C must be used (VLT 5001 - 5062 380 - 500 V, 525 - 600 V and VLT 5001 - 5027 200 - 240 V).
If UL/cUL is to be complied with, copper cable with temperature class 75°C must be used (VLT 5072 - 5552 380 - 500 V, VLT 5032 - 5052 200 - 240 V, VLT 5042 - 5352 525 - 690 V).
Connectors are for use of both copper and aluminium cables, unless other is specified.

Accuracy of display readout (parameters 009-012):

Motor current [6] 0-140% load	Max. error: ±2.0% of rated output current
Torque % [7], -100 - 140% load	Max. error: ±5% of rated motor size
Output [8], power HP [9], 0-90% load	Max. error: ±5% of rated output

Control characteristics:

Frequency range ..... 0 - 1000 Hz
Resolution on output frequency ..... ±0.003 Hz
System response time ..... 3 msec.
Speed, control range (open loop) ..... 1:100 of synchro. speed
Speed, control range (closed loop) ..... 1:1000 of synchro. speed
Speed, accuracy (open loop) ..... < 1500 rpm: max. error ± 7.5 rpm
..... >1500 rpm: max. error of 0.5% of actual speed
Speed, accuracy (closed loop) ..... < 1500 rpm: max. error ± 1.5 rpm
..... >1500 rpm: max. error of 0.1% of actual speed
Torque control accuracy (open loop) ..... 0- 150 rpm: max. error ±20% of rated torque
..... 150-1500 rpm: max. error ±10% of rated torque
..... >1500 rpm: max. error ±20% of rated torque
Torque control accuracy (speed feedback) ..... Max. error ±5% of rated torque
All control characteristics are based on a 4-pole asynchronous motor

Externals:

Enclosure (dependent on power size) ..... IP 00, IP 20, IP 21, Nema 1, IP 54
Vibration test ..... 0.7 g RMS 18-1000 Hz random. 3 directions for 2 hours (IEC 68-2-34/35/36)
Max. relative humidity ..... 93 % (IEC 68-2-3) for storage/transport
Max. relative humidity ..... 95 % non condensing (IEC 721-3-3; class 3K3) for operation
Aggressive environment (IEC 721 - 3 - 3) ..... Uncoated class 3C2
Aggressive environment (IEC 721 - 3 - 3) ..... Coated class 3C3
Ambient temperature IP 20/Nema 1 (high overload torque 160%) ..... Max. 45°C (24-hour average max. 40°C)
Ambient temperature IP 20/Nema 1 (normal overload torque 110%) ..... Max. 40°C (24-hour average max. 35°C)
Ambient temperature IP 54 (high overload torque 160%) ..... Max. 40°C (24-hour average max. 35°C)
Ambient temperature IP 54 (normal overload torque 110%) ..... Max. 40°C (24-hour average max. 35°C)
Ambient temperature IP 20/54 VLT 5011 500 V ..... Max. 40°C (24-hour average max. 35°C)
Ambient temperature IP 54 VLT 5042-5352, 525-690 V; and 5122-5552, 380-500 V (high overload torque 160%) ..... Max. 45°C (24-hour average max. 40°C)
Derating for high ambient temperature, see the Design Guide
Min. ambient temperature in full operation ..... 0°C
Min. ambient temperature at reduced performance ..... -10°C
Temperature during storage/transport ..... -25 - +65/70°C
Max. altitude above sea level ..... 1000 m
Derating for altitude over 1000 m above sealevel, see the Design Guide
EMC standards applied, Emission ..... EN 61000-6-3, EN 61000-6-4, EN 61800-3, EN 55011
EMC standards applied, Immunity ..... EN 61000-6-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 EN 61000-4-5, EN 61000-4-6, VDE 0160/1990.12
See section on special conditions in the Design Guide
VLT 5001-5062, 525 - 600 V do not comply with EMC or Low Voltage Directives.

VLT 5000 Series protection:

- Electronic motor thermal protection against overload.
- Temperature monitoring of heat-sink ensures that the frequency converter cuts out if the temperature reaches 90°C for IP 00, IP 20 and Nema 1. For IP 54, the cut-out temperature is 80°C. An overtemperature can only be reset when the temperature of the heat-sink has fallen below 60°C.

  For the units mentioned below, the limits are as follows:

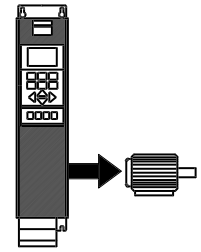
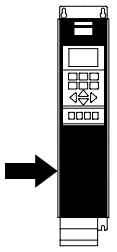
  - VLT 5122, 380-500 V, cuts out at 75°C and can be reset if the temperature has fallen below 60°C.
  - VLT 5152, 380-500 V, cuts out at 80°C and can be reset if the temperature has fallen below 60°C.
  - VLT 5202, 380-500 V, cuts out at 95°C and can be reset if the temperature has fallen below 65°C.
  - VLT 5252, 380-500 V, cuts out at 95°C and can be reset if the temperature has fallen below 65°C.
  - VLT 5302, 380-500 V, cuts out at 105°C and can be reset if the temperature has fallen below 75°C.
  - VLT 5352-5552, 380-500 V, cut out at 85°C and can be reset if the temperature has fallen below 60°C.
  - VLT 5042-5122, 525-690 V, cut out at 75°C and can be reset if the temperature has fallen below 60°C.
  - VLT 5152, 525-690 V, cuts out at 80°C and can be reset if the temperature has fallen below 60°C.
  - VLT 5202-5352, 525-690 V, cut out at 100°C and can be reset if the temperature has fallen below 70°C.

- The frequency converter is protected against short-circuiting on motor terminals U, V, W.
- The frequency converter is protected against earth fault on motor terminals U, V, W.
- Monitoring of the intermediate circuit voltage ensures that the frequency converter cuts out if the intermediate circuit voltage becomes too high or too low.
- If a motor phase is missing, the frequency converter cuts out, see parameter 234 *Motor phase monitor.*
- If there is a mains fault, the frequency converter is able to carry out a controlled decelleration.
- If a mains phase is missing, the frequency converter will cut out when a load is placed on the motor.

■ Electrical data

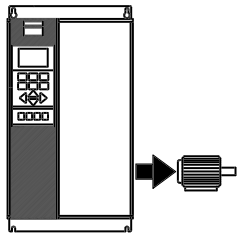
■ Bookstyle and Compact, Mains supply

3 x 200 - 240 V

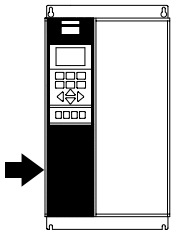
According to international requirements	VLT type	5001	5002	5003	5004	5005	5006
 Output current	$I_{VLT,N}$ [A]	3.7	5.4	7.8	10.6	12.5	15.2
	$I_{VLT,MAX}$ (60 s) [A]	5.9	8.6	12.5	17	20	24.3
Output (240 V)	$S_{VLT,N}$ [kVA]	1.5	2.2	3.2	4.4	5.2	6.3
Typical shaft output	$P_{VLT,N}$ [kW]	0.75	1.1	1.5	2.2	3.0	3.7
Typical shaft output	$P_{VLT,N}$ [HP]	1	1.5	2	3	4	5
Max. cable cross-section to motor, brake and loadsharing [mm ^{2}]/[AWG]^2)		4/10	4/10	4/10	4/10	4/10	4/10
 Rated input current	(200 V)$I_{L,N}$ [A]	3.4	4.8	7.1	9.5	11.5	14.5
Max. cable cross-section power [mm^2]/[AWG] ^{2})		4/10	4/10	4/10	4/10	4/10	4/10
Max. pre-fuses	[-]/UL[1] [A]	16/10	16/10	16/15	25/20	25/25	35/30
Efficiency[3]		0.95	0.95	0.95	0.95	0.95	0.95
Weight IP 20 EB Bookstyle	[kg]	7	7	7	9	9	9.5
Weight IP 20 EB Compact	[kg]	8	8	8	10	10	10
Weight IP 54 Compact	[kg]	11.5	11.5	11.5	13.5	13.5	13.5
Power loss at max. load.	[W]	58	76	95	126	172	194
Enclosure		IP 20/ IP54	IP 20/ IP54	IP 20/ IP54	IP 20/ IP54	IP 20/ IP54	IP 20/ IP54

1. For type of fuse see section *Fuses.*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.

■ Compact, Mains supply 3 x 200 - 240 V



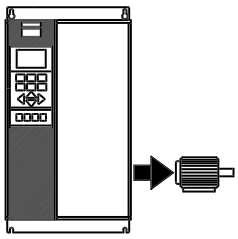
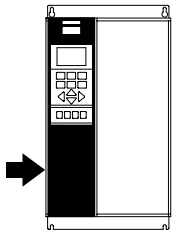
According to international requirements	VLT type		5008	5011	5016	5022	5027
Normal overload torque (110 %):							
Output current	$I_{VLT,N}$ [A]		32	46	61.2	73	88
	$I_{VLT,MAX}$ (60 s) [A]		35.2	50.6	67.3	80.3	96.8
Output (240 V)	$S_{VLT,N}$ [kVA]		13.3	19.1	25.4	30.3	36.6
Typical shaft output	$P_{VLT,N}$ [kW]		7.5	11	15	18.5	22
Typical shaft output	$P_{VLT,N}$ [HP]		10	15	20	25	30
High overload torque (160 %):							
Output current	$I_{VLT,N}$ [A]		25	32	46	61.2	73
	$I_{VLT,MAX}$ (60 s) [A]		40	51.2	73.6	97.9	116.8
Output (240 V)	$S_{VLT,N}$ [kVA]		10	13	19	25	30
Typical shaft output	$P_{VLT,N}$ [kW]		5.5	7.5	11	15	18.5
Typical shaft output	$P_{VLT,N}$ [HP]		7.5	10	15	20	25
Max. cable cross-section to motor,		IP 54	16/6	16/6	35/2	35/2	50/0
brake and loadsharing [mm² /AWG][2)5)]		IP 20	16/6	35/2	35/2	35/2	50/0
Min. cable cross-section to motor, brake and loadsharing[4)] [mm² /AWG][2)]			10/8	10/8	10/8	10/8	16/6



Rated input current	(200 V) $I_{L,N}$ [A]		32	46	61	73	88
Max. cable cross-section,		IP 54	16/6	16/6	35/2	35/2	50/0
power [mm²]/[AWG][2)5)]		IP 20	16/6	35/2	35/2	35/2	50/0
Max. pre-fuses	[-]/UL[1)] [A]		50	60	80	125	125
Efficiency[3)]			0.95	0.95	0.95	0.95	0.95
Weight IP 20 EB	[kg]		21	25	27	34	36
Weight IP 54	[kg]		38	40	53	55	56
Power loss at max. load. - high overload torque (160 %)	[W]		340	426	626	833	994
- normal overload torque (110 %)	[W]		426	545	783	1042	1243
Enclosure			IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54

1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Min. cable cross-section is the smallest cable cross-section allowed to be fitted on the terminals to comply with IP 20. Always comply with national and local regulations on min. cable cross-section.
5. Aluminium cables with cross-section above 35 mm² must be connected by use of a Al-Cu connector.

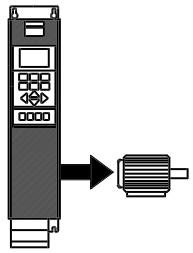
■ Compact, Mains supply 3 x 200 - 240 V

According to international requirements		VLT type	5032	5042	5052
	Normal overload torque (110 %):				
	Output current	$I_{VLT,N}$ [A] (200-230 V)	115	143	170
		$I_{VLT,MAX}$ (60 s) [A] (200-230 V)	127	158	187
		$I_{VLT,N}$ [A] (231-240 V)	104	130	154
		$I_{VLT,MAX}$ (60 s) [A] (231-240 V)	115	143	170
	Output	$S_{VLT,N}$ [kVA] (208 V)	41	52	61
		$S_{VLT,N}$ [kVA] (230 V)	46	57	68
		$S_{VLT,N}$ [kVA] (240 V)	43	54	64
	Typical shaft output	[HP] (208 V)	40	50	60
	Typical shaft output	[kW] (230 V)	30	37	45
	High overload torque (160 %):				
	Output current	$I_{VLT,N}$ [A] (200-230 V)	88	115	143
		$I_{VLT,MAX}$ [A] (200-230 V)	132	173	215
		$I_{VLT,N}$ [A] (231-240 V)	80	104	130
		$I_{VLT,MAX}$ [A] (231-240 V)	120	285	195
	Output	$S_{VLT,N}$ [kVA] (208 V)	32	41	52
		$S_{VLT,N}$ [kVA] (230 V)	35	46	57
		$S_{VLT,N}$ [kVA] (240 V)	33	43	54
	Typical shaft output	[HP] (208 V)	30	40	50
		[kW] (230 V)	22	30	37
	Max. cable cross-section to motor	[mm²][4,6]		120	
	and loadsharing	[AWG][2,4,6]		300 mcm	
	Max. cable cross-section to brake	[mm²][4,6]		25	
		[AWG][2,4,6]		4	
	Normal overload torque (110 %):				
	Rated input current	$I_{L,N}$ [A] (230 V)	101.3	126.6	149.9
	Normal overload torque (150 %):				
	Rated input current	$I_{L,N}$ [A] (230 V)	77,9	101,3	126,6
	Max. cable cross-section	[mm²][4,6]		120	
	power supply	[AWG][2,4,6]		300 mcm	
	Min. cable cross-section to motor,	[mm²][4,6]		6	
	power	[AWG][2,4,6]		8	
	supply, brake and loadsharing				
	Max. pre-fuses (mains) [-]/UL	[A][1]	150/150	200/200	250/250
	Efficiency[3]			0,96-0,97	
	Power loss	Normal overload [W]	1089	1361	1612
		High overload [W]	838	1089	1361
	Weight	IP 00 [kg]	101	101	101
	Weight	IP 20 Nema1 [kg]	101	101	101
	Weight	IP 54 Nema12 [kg]	104	104	104
	Enclosure	IP 00 / Nema 1 (IP 20) / IP 54			

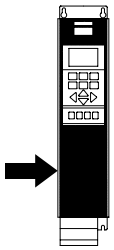
1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Max. cable cross-section is the maximum possible cable cross-section allowed to be fitted on the terminals. Min. cable cross-section is the minimum allowed cross-section. Always comply with national and local regulations on min. cable cross-section.
5. Weight without shipping container.
6. Connection stud: M8 Brake: M6.

■ Bookstyle and Compact, Mains supply

3 x 380 - 500 V



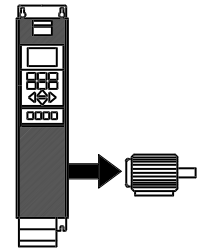
According to international requirements		VLT type	5001	5002	5003	5004
Output current		$I_{VLT,N}$ [A] (380-440 V)	2.2	2.8	4.1	5.6
		$I_{VLT,MAX}$ (60 s) [A] (380-440 V)	3.5	4.5	6.5	9
		$I_{VLT,N}$ [A] (441-500 V)	1.9	2.6	3.4	4.8
		$I_{VLT,MAX}$ (60 s) [A] (441-500 V)	3	4.2	5.5	7.7
Output		$S_{VLT,N}$ [kVA] (380-440 V)	1.7	2.1	3.1	4.3
		$S_{VLT,N}$ [kVA] (441-500 V)	1.6	2.3	2.9	4.2
Typical shaft output		$P_{VLT,N}$ [kW]	0.75	1.1	1.5	2.2
Typical shaft output		$P_{VLT,N}$ [HP]	1	1.5	2	3
Max. cable cross-section to motor, brake and loadsharing [mm²]/[AWG]²)			4/10	4/10	4/10	4/10



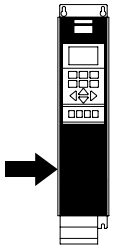
Rated input current		$I_{L,N}$ [A] (380 V)	2.3	2.6	3.8	5.3
		$I_{L,N}$ [A] (460 V)	1.9	2.5	3.4	4.8
Max. cable cross-section, power [mm²]/[AWG][2)]			4/10	4/10	4/10	4/10
Max. pre-fuses [-]/UL[1)] [A]			16/6	16/6	16/10	16/10
Efficiency [3)]			0.96	0.96	0.96	0.96
Weight IP 20 EB Bookstyle [kg]			7	7	7	7.5
Weight IP 20 EB Compact [kg]			8	8	8	8.5
Weight IP 54 Compact [kg]			11.5	11.5	11.5	12
Power loss at max. load		[W]	55	67	92	110
Enclosure			IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54

1. For type of fuse see section *Fuses*.
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.

Bookstyle and Compact, Mains supply
3 x 380 - 500 V



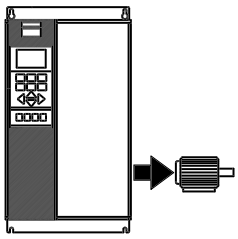
According to international requirements	VLT type	5005	5006	5008	5011
Output current	$I_{VLT,N}$ [A] (380-440 V)	7.2	10	13	16
	$I_{VLT,MAX}$ (60 s) [A] (380-440 V)	11.5	16	20.8	25.6
	$I_{VLT,N}$ [A] (441-500 V)	6.3	8.2	11	14.5
	$I_{VLT,MAX}$ (60 s) [A] (441-500 V)	10.1	13.1	17.6	23.2
Output	$S_{VLT,N}$ [kVA] (380-440 V)	5.5	7.6	9.9	12.2
	$S_{VLT,N}$ [kVA] (441-500 V)	5.5	7.1	9.5	12.6
Typical shaft output	$P_{VLT,N}$ [kW]	3.0	4.0	5.5	7.5
Typical shaft output	$P_{VLT,N}$ [HP]	4	5	7.5	10
Max. cable cross-section to motor, brake and loadsharing [mm²]/[AWG]²)		4/10	4/10	4/10	4/10

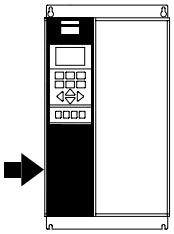


Rated input current	$I_{L,N}$ [A] (380 V)	7	9.1	12.2	15.0
	$I_{L,N}$ [A] (460 V)	6	8.3	10.6	14.0
Max. cable cross-section power [mm²]/[AWG]²⁾		4/10	4/10	4/10	4/10
Max. pre-fuses [-]/UL¹⁾ [A]		16/15	25/20	25/25	35/30
Efficiency ³⁾		0.96	0.96	0.96	0.96
Weight IP 20 EB Bookstyle [kg]		7.5	9.5	9.5	9.5
Weight IP 20 EB Compact [kg]		8.5	10.5	10.5	10.5
Weight IP 54 EB Compact [kg]		12	14	14	14
Power loss at max. load.	[W]	139	198	250	295
Enclosure		IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54

1. For type of fuse see section *Fuses*.
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.

■ Compact, Mains supply 3 x 380 - 500 V

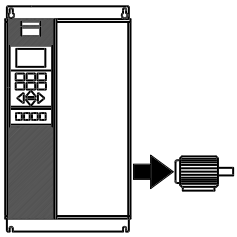


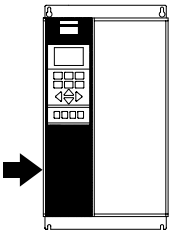


According to international requirements	VLT type		5016	5022	5027
Normal overload torque (110 %):					
Output current	$I_{VLT,N}$ [A] (380-440 V)		32	37.5	44
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		35.2	41.3	48.4
	$I_{VLT,N}$ [A] (441-500 V)		27.9	34	41.4
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		30.7	37.4	45.5
Output	$S_{VLT,N}$ [kVA] (380-440 V)		24.4	28.6	33.5
	$S_{VLT,N}$ [kVA] (441-500 V)		24.2	29.4	35.8
Typical shaft output	$P_{VLT,N}$ [kW]		15	18.5	22
Typical shaft output	$P_{VLT,N}$ [HP]		20	25	30
High overload torque (160 %):					
Output current	$I_{VLT,N}$ [A] (380-440 V)		24	32	37.5
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		38.4	51.2	60
	$I_{VLT,N}$ [A] (441-500 V)		21.7	27.9	34
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		34.7	44.6	54.4
Output	$S_{VLT,N}$ [kVA] (380-440 V)		18.3	24.4	28.6
	$S_{VLT,N}$ [kVA] (441-500 V)		18.8	24.2	29.4
Typical shaft output	$P_{VLT,N}$ [kW]		11	15	18.5
Typical shaft output	$P_{VLT,N}$ [HP]		15	20	25
Max. cable cross-section to motor,		IP 54	16/6	16/6	16/6
brake and loadsharing [mm^2]/[AWG][2)]		IP 20	16/6	16/6	35/2
Min. cable cross-section to motor, brake and loadsharing [mm2]/[AWG][2) 4)]			10/8	10/8	10/8
Rated input current	$I_{L,N}$ [A] (380 V)		32	37.5	44
	$I_{L,N}$ [A] (460 V)		27.6	34	41
Max. cable cross-section,		IP 54	16/6	16/6	16/6
power [mm ^{2}]/[AWG]		IP 20	16/6	16/6	35/2
Max. pre-fuses	[-]/UL[1)] [A]		63/40	63/50	63/60
Efficiency[3)]			0.96	0.96	0.96
Weight IP 20 EB	[kg]		21	22	27
Weight IP 54	[kg]		41	41	42
Power loss at max. load.					
- high overload torque (160 %)	[W]		419	559	655
- normal overload torque (110 %)	[W]		559	655	768
Enclosure			IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54

1. For type of fuse see section *Fuses.*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Min. cable cross-section is the smallest cable cross-section allowed to be fitted on the terminals to comply with IP 20. Always comply with national and local regulations on min. cable cross-section.

Compact, Mains supply 3 x 380 - 500 V

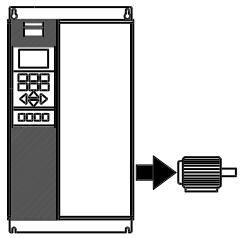


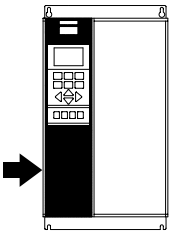


According to international requirements	VLT type		5032	5042	5052
Normal overload torque (110 %):					
Output current	$I_{VLT,N}$ [A] (380-440 V)		61	73	90
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		67.1	80.3	99
	$I_{VLT,N}$ [A] (441-500 V)		54	65	78
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		59.4	71.5	85.8
Output	$S_{VLT,N}$ [kVA] (380-440 V)		46.5	55.6	68.6
	$S_{VLT,N}$ [kVA] (441-500 V)		46.8	56.3	67.5
Typical shaft output	$P_{VLT,N}$ [kW]		30	37	45
Typical shaft output	$P_{VLT,N}$ [HP]		40	50	60
High overload torque (160 %):					
Output current	$I_{VLT,N}$ [A] (380-440 V)		44	61	73
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		70.4	97.6	116.8
	$I_{VLT,N}$ [A] (441-500 V)		41.4	54	65
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		66.2	86	104
Output	$S_{VLT,N}$ [kVA] (380-440 V)		33.5	46.5	55.6
	$S_{VLT,N}$ [kVA] (441-500 V)		35.9	46.8	56.3
Typical shaft output	$P_{VLT,N}$ [kW]		22	30	37
Typical shaft output	$P_{VLT,N}$ [HP]		30	40	50
Max. cable cross-section to motor,		IP 54	35/2	35/2	50/0
brake and loadsharing [mm²]/[AWG][2)5)]		IP20	35/2	35/2	50/0
Min. cable cross-section to motor, brake and loadsharing [mm²]/[AWG][2)4)]			10/8	10/8	16/6
Rated input current	$I_{L,N}$ [A] (380 V)		60	72	89
	$I_{L,N}$ [A] (460 V)		53	64	77
Max. cable cross-section		IP 54	35/2	35/2	50/0
power[mm ²]/[AWG][2) 5)]		IP 20	35/2	35/2	50/0
Max. pre-fuses	[-]/UL[1)] [A]		80/80	100/100	125/125
Efficiency[3)]			0.96	0.96	0.96
Weight IP 20 EB	[kg]		28	41	42
Weight IP 54	[kg]		54	56	56
Power loss at max. load.					
- high overload torque (160 %)	[W]		768	1065	1275
- normal overload torque (110 %)	[W]		1065	1275	1571
Enclosure			IP 20/ IP 54	IP 20/ IP 54	IP 20/ IP 54

1. For type of fuse see section *Fuses.*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Min. cable cross-section is the smallest cable cross-section allowed to be fitted on the terminals to comply with IP 20. Always comply with national and local regulations on min. cable cross-section.
5. Aluminium cables with cross-section above 35 mm² must be connected by use of a Al-Cu connector.

Compact, Mains supply 3 x 380 - 500 V

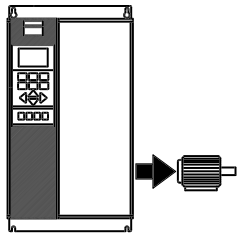


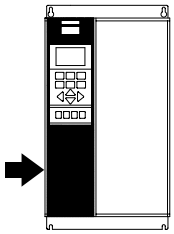


According to international requirements	VLT type		5062	5072	5102
Normal overload torque (110 %):					
Output current	$I_{VLT,N}$ [A] (380-440 V)		106	147	177
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		117	162	195
	$I_{VLT,N}$ [A] (441-500 V)		106	130	160
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		117	143	176
Output	$S_{VLT,N}$ [kVA] (380-440 V)		80.8	102	123
	$S_{VLT,N}$ [kVA] (441-500 V)		91.8	113	139
Typical shaft output	$P_{VLT,N}$ [kW] (400 V)		55	75	90
	$P_{VLT,N}$ [HP] (460 V)		75	100	125
	$P_{VLT,N}$ [kW] (500 V)		75	90	110
High overload torque (160 %):					
Output current	$I_{VLT,N}$ [A] (380-440 V)		90	106	147
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		135	159	221
	$I_{VLT,N}$ [A] (441-500 V)		80	106	130
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		120	159	195
Output	$S_{VLT,N}$ [kVA] (380-440 V)		68.6	73.0	102
	$S_{VLT,N}$ [kVA] (441-500 V)		69.3	92.0	113
Typical shaft output	$P_{VLT,N}$ [kW] (400 V)		45	55	75
	$P_{VLT,N}$ [HP] (460 V)		60	75	100
	$P_{VLT,N}$ [kW] (500 V)		55	75	90
Max. cable cross-section to motor,		IP 54	50/0[5]	150/300 mcm[6]	150/300 mcm[6]
brake and loadsharing [mm²]/[AWG][2]		IP20	50/0[5]	120/250 mcm[5]	120/250 mcm[5]
Min. cable cross-section to motor, brake and loadsharing [mm²]/[AWG][4]			16/6	25/4	25/4
Rated input current	$I_{L,N}$ [A] (380 V)		104	145	174
	$I_{L,N}$ [A] (460 V)		104	128	158
Max. cable cross-section		IP 54	50/0[5]	150/300 mcm	150/300 mcm
power[mm²]/[AWG][2]		IP 20	50/0[5]	120/250 mcm[5]	120/250 mcm[5]
Max. pre-fuses	[-]/UL[1] [A]		160/150	225/225	250/250
Efficiency[3]			>0.97	>0.97	>0.97
Weight IP 20 EB	[kg]		43	54	54
Weight IP 54	[kg]		60	77	77
Power loss at max. load.					
- high overload torque (160 %)	[W]		1122	1058	1467
- normal overload torque (110 %)	[W]		1322	1467	1766
Enclosure			IP20/ IP 54	IP20/ IP 54	IP20/ IP 54

1. For type of fuse see section *Fuses.*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Min. cable cross-section is the smallest cable cross-section allowed to be fitted on the terminals to comply with IP 20. Always comply with national and local regulations on min. cable cross-section.
5. Aluminium cables with cross-section above 35 mm² must be connected by use of a Al-Cu connector.
used.
6. Brake and loadsharing: 95 mm² / AWG 3/0

■ Compact, Mains supply 3 x 380 - 500 V





According to international requirements		VLT type	5122	5152	5202	5252	5302
Normal overload current (110 %):							
Output current	$I_{VLT,N}$ [A] (380-440 V)		212	260	315	395	480
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		233	286	347	434	528
	$I_{VLT,N}$ [A] (441-500 V)		190	240	302	361	443
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		209	264	332	397	487
Output	$S_{VLT,N}$ [kVA] (400 V)		147	180	218	274	333
	$S_{VLT,N}$ [kVA] (460 V)		151	191	241	288	353
	$S_{VLT,N}$ [kVA] (500 V)		165	208	262	313	384
Typical shaft output	[kW] (400 V)		110	132	160	200	250
	[HP] (460 V)		150	200	250	300	350
	[kW] (500 V)		132	160	200	250	315
High overload torque (160 %):							
Output current	$I_{VLT,N}$ [A] (380-440 V)		177	212	260	315	395
	$I_{VLT, MAX}$ (60 s) [A] (380-440 V)		266	318	390	473	593
	$I_{VLT,N}$ [A] (441-500 V)		160	190	240	302	361
	$I_{VLT, MAX}$ (60 s) [A] (441-500 V)		240	285	360	453	542
Output	$S_{VLT,N}$ [kVA] (400 V)		123	147	180	218	274
	$S_{VLT,N}$ [kVA] (460 V)		127	151	191	241	288
	$S_{VLT,N}$ [kVA] (500 V)		139	165	208	262	313
Typical shaft output	[kW] (400 V)		90	110	132	160	200
	[HP] (460 V)		125	150	200	250	300
	[kW] (500 V)		110	132	160	200	250
Max. cable cross-section	[mm²][4,6]		2 x 70		2 x 185		
to motor	[AWG][2,4,6]		2 x 2/0		2 x 350 mcm		
Max. cable cross-section	[mm²][4,6]		2 x 70		2 x 185		
to loadsharing and brake	[AWG][2,4,6]		2 x 2/0		2 x 350 mcm		
Normal overload current (110 %):							
Rated input current	$I_{L,N}$ [A] (380-440 V)		208	256	317	385	467
	$I_{L,N}$ [A] (441-500 V)		185	236	304	356	431
High overload torque (160 %):							
Rated input current	$I_{L,N}$ [A] (380-440 V)		174	206	256	318	389
	$I_{L,N}$ [A] (441-500 V)		158	185	236	304	356
Max. cable cross-section	[mm²][4,6]		2 x 70		2 x 185		
power supply	[AWG][2,4,6]		2 x 2/0		2 x 350 mcm		
Max. pre-fuses (mains)	[A][1]		300/	350/	450/	500/	630/
[-]/UL			300	350	400	500	600
Efficiency[3]			0,98				
Power loss	Normal overload [W]		2619	3309	4163	4977	6107
	High overload [W]		2206	2619	3309	4163	4977
Weight	IP 00 [kg]		82	91	112	123	138
Weight	IP 21/Nema1 [kg]		96	104	125	136	151
Weight	IP 54/Nema12 [kg]		96	104	125	136	151
Enclosure	IP 00, IP 21/Nema 1 and IP 54/Nema12						

1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Max. cable cross-section is the maximum possible cable cross-section allowed to be fitted on the terminals. Always comply with national and local regulations on min. cable cross-section.
5. Weight without shipping container.
6. Connection bolt power supply and motor: M10; Brake and loadsharing: M8

■ Compact, Mains supply 3 x 380 - 500 V

According to international requirements		VLT type	5352	5452	5502	5552
	Normal overload current (110 %):					
Output current		$I_{VLT,N}$ [A] (380-440 V)	600	658	745	800
		$I_{VLT, MAX}$ (60 s) [A] (380-440 V)	660	724	820	880
		$I_{VLT,N}$ [A] (441-500 V)	540	590	678	730
		$I_{VLT, MAX}$ (60 s) [A] (441-500 V)	594	649	746	803
Output		$S_{VLT,N}$ [kVA] (400 V)	416	456	516	554
		$S_{VLT,N}$ [kVA] (460 V)	430	470	540	582
		$S_{VLT,N}$ [kVA] (500 V)	468	511	587	632
Typical shaft output		[kW] (400 V)	315	355	400	450
		[HP] (460 V)	450	500	550/600	600
		[kW] (500 V)	355	400	500	530
	High overload torque (160 %):					
Output current		$I_{VLT,N}$ [A] (380-440 V)	480	600	658	695
		$I_{VLT, MAX}$ (60 s) [A] (380-440 V)	720	900	987	1042
		$I_{VLT,N}$ [A] (441-500 V)	443	540	590	678
		$I_{VLT, MAX}$ (60 s) [A] (441-500 V)	665	810	885	1017
Output		$S_{VLT,N}$ [kVA] (400 V)	333	416	456	482
		$S_{VLT,N}$ [kVA] (460 V)	353	430	470	540
		$S_{VLT,N}$ [kVA] (500 V)	384	468	511	587
Typical shaft output		[kW] (400 V)	250	315	355	400
		[HP] (460 V)	350	450	500	550
		[kW] (500 V)	315	355	400	500
Max. cable cross-section to motor and loadsharing		[mm²][4,6] [AWG][2,4,6]	4x240 4x500 mcm			
Max. cable cross-section to brake		[mm²][4,6] [AWG][2,4,6]	2x185 2x350 mcm			
	Normal overload current (110 %):					
Rated input current		$I_{L,N}$ [A] (380-440 V)	590	647	733	787
		$I_{L,N}$ [A] (441-500 V)	531	580	667	718
	High overload torque (160 %):					
Rated input current		$I_{L,N}$ [A] (380-440 V)	472	590	647	684
		$I_{L,N}$ [A] (441-500 V)	436	531	580	667
Max. cable cross-section power supply		[mm²][4,6] [AWG][2,4,6]	4x240 4x500 mcm			
Max. pre-fuses (mains) [-]/UL		[A][1]	700/700	900/900	900/900	900/900
Efficiency[3]			0.98			
Power loss		Normal overload [W]	7630	7701	8879	9428
		High overload [W]	6005	6960	7691	7964
Weight		IP 00 [kg]	221	234	236	277
Weight		IP 21/Nema1 [kg]	263	270	272	313
Weight		IP 54/Nema12 [kg]	263	270	272	313
Enclosure			IP 00, IP 21/Nema 1 and IP 54/Nema12			

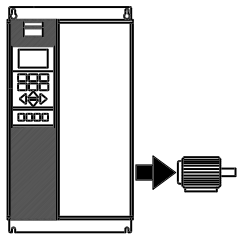
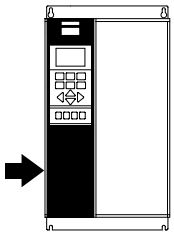
1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Max. cable cross-section is the maximum possible cable cross-section allowed to be fitted on the terminals. Always comply with national and local regulations on min. cable cross-section.
5. Weight without shipping container.
6. Connection bolt power supply, motor and loadsharing: M10 (compression lug), 2xM8 (box lug), M8 (brake)

■ Compact, Mains supply 3 x 525 - 600 V

According to international requirements	VLT type	5001	5002	5003	5004
Normal overload torque (110 %):					
Output current	$I_{VLT,N}$ [A] (550 V)	2.6	2.9	4.1	5.2
	$I_{VLT,MAX}$ (60 s) [A] (550 V)	2.9	3.2	4.5	5.7
	$I_{VLT,N}$ [A] (575 V)	2.4	2.7	3.9	4.9
	$I_{VLT,MAX}$ (60 s) [A] (575 V)	2.6	3.0	4.3	5.4
Output	$S_{VLT,N}$ [kVA] (550 V)	2.5	2.8	3.9	5.0
	$S_{VLT,N}$ [kVA] (575 V)	2.4	2.7	3.9	4.9
Typical shaft output	$P_{VLT,N}$ [kW]	1.1	1.5	2.2	3
Typical shaft output	$P_{VLT,N}$ [HP]	1.5	2	3	4
Highl overload torque (160%):					
Output current	$I_{VLT,N}$ [A] (550 V)	1.8	2.6	2.9	4.1
	$I_{VLT,MAX}$ (60 s) [A] (550 V)	2.9	4.2	4.6	6.6
	$I_{VLT,N}$ [A] (575 V)	1.7	2.4	2.7	3.9
	$I_{VLT,MAX}$ (60 s) [A] (575 V)	2.7	3.8	4.3	6.2
Output	$S_{VLT,N}$ [kVA] (550 V)	1.7	2.5	2.8	3.9
	$S_{VLT,N}$ [kVA] (575 V)	1.7	2.4	2.7	3.9
Typical shaft output	$P_{VLT,N}$ [kW]	0.75	1.1	1.5	2.2
Typical shaft output	$P_{VLT,N}$ [HP]	1	1.5	2	3
Max. cable cross-section to motor, brake and loadsharing [mm²]/[AWG][2)]		4/10	4/10	4/10	4/10
Normal overload torque (110 %):					
Rated input current	$I_{L,N}$ [A] (550 V)	2.5	2.8	4.0	5.1
	$I_{L,N}$ [A] (600 V)	2.2	2.5	3.6	4.6
High overload torque (160 %):					
Rated input current	$I_{L,N}$ [A] (550 V)	1.8	2.5	2.8	4.0
	$I_{L,N}$ [A] (600 V)	1.6	2.2	2.5	3.6
Max. cable cross-section, power [mm²]/[AWG][2)]		4/10	4/10	4/10	4/10
Max. pre-fuses	[-]/UL[1)] [A]	3	4	5	6
Efficiency [3)]		0.96	0.96	0.96	0.96
Weight IP 20 EB	[kg]	10.5	10.5	10.5	10.5
Power loss at max. load.	[W]	63	71	102	129
Enclosure		IP 20 / Nema 1			

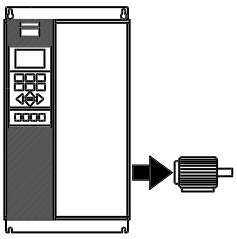
1. For type of fuses see section *Fuses*.
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.

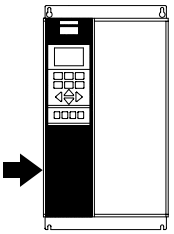
Compact, Mains supply 3 x 525 - 600 V

According to international requirements	VLT type	5005	5006	5008	5011
	**Normal overload torque (110 %):**				
Output current	$I_{VLT,N}$ [A] (550 V)	6.4	9.5	11.5	11.5
	$I_{VLT,MAX}$ (60 s) [A] (550 V)	7.0	10.5	12.7	12.7
	$I_{VLT,N}$ [A] (575 V)	6.1	9.0	11.0	11.0
	$I_{VLT,MAX}$ (60 s) [A] (575 V)	6.7	9.9	12.1	12.1
Output	$S_{VLT,N}$ [kVA] (550 V)	6.1	9.0	11.0	11.0
	$S_{VLT,N}$ [kVA] (575 V)	6.1	9.0	11.0	11.0
Typical shaft output	$P_{VLT,N}$ [kW]	4	5.5	7.5	7.5
Typical shaft output	$P_{VLT,N}$ [HP]	5	7.5	10.0	10.0
	Highl overload torque (160%):				
Output current	$I_{VLT,N}$ [A] (550 V)	5.2	6.4	9.5	11.5
	$I_{VLT,MAX}$ (60 s) [A] (550 V)	8.3	10.2	15.2	18.4
	$I_{VLT,N}$ [A] (575 V)	4.9	6.1	9.0	11.0
	$I_{VLT,MAX}$ (60 s) [A] (575 V)	7.8	9.8	14.4	17.6
Output	$S_{VLT,N}$ [kVA] (550 V)	5.0	6.1	9.0	11.0
	$S_{VLT,N}$ [kVA] (575 V)	4.9	6.1	9.0	11.0
Typical shaft output	$P_{VLT,N}$ [kW]	3	4	5.5	7.5
Typical shaft output	$P_{VLT,N}$ [HP]	4	5	7.5	10
Max. cable cross-section to motor, brake and loadsharing [mm²]/[AWG][2)]		4/10	4/10	4/10	4/10
	**Normal overload torque (110 %):**				
Rated input current	$I_{l,N}$ [A] (550 V)	6.2	9.2	11.2	11.2
	$I_{l,N}$ [A] (600 V)	5.7	8.4	10.3	10.3
	High overload torque (160 %):				
Rated input current	$I_{l,N}$ [A] (550 V)	5.1	6.2	9.2	11.2
	$I_{l,N}$ [A] (600 V)	4.6	5.7	8.4	10.3
Max. cable cross-section, power [mm²]/[AWG][2)]		4/10	4/10	4/10	4/10
Max. pre-fuses	[-]/UL[1)] [A]	8	10	15	20
Efficiency [3)]		0.96	0.96	0.96	0.96
Weight IP 20 EB	[kg]	10.5	10.5	10.5	10.5
Power loss at max. load.	[W]	160	236	288	288
Enclosure		IP 20 / Nema 1			

1. For type of fuses see section *Fuses*.
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.

■ Compact, Mains supply 3 x 525 - 600 V

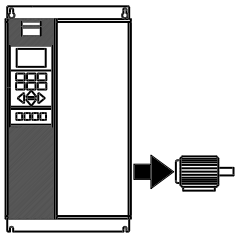


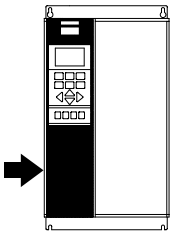


According to international requirements		VLT type	5016	5022	5027
Normal overload torque (110 %):					
Output current		$I_{VLT,N}$ [A] (550 V)	23	28	34
		$I_{VLT,MAX}$ (60 s) [A] (550 V)	25	31	37
		$I_{VLT,N}$ [A] (575 V)	22	27	32
		$I_{VLT,MAX}$ (60 s) [A] (575 V)	24	30	35
Output		$S_{VLT,N}$ [kVA] (550 V)	22	27	32
		$S_{VLT,N}$ [kVA] (575 V)	22	27	32
Typical shaft output		$P_{VLT,N}$ [kW]	15	18.5	22
Typical shaft output		$P_{VLT,N}$ [HP]	20	25	30
High overload torque (160 %):					
Output current		$I_{VLT,N}$ [A] (550 V)	18	23	28
		$I_{VLT,MAX}$ (60 s) [A] (550 V)	29	37	45
		$I_{VLT,N}$ [A] (575 V)	17	22	27
		$I_{VLT,MAX}$ (60 s) [A] (575 V)	27	35	43
Output		$S_{VLT,N}$ [kVA] (550 V)	17	22	27
		$S_{VLT,N}$ [kVA] (575 V)	17	22	27
Typical shaft output		$P_{VLT,N}$ [kW]	11	15	18.5
Typical shaft output		$P_{VLT,N}$ [HP]	15	20	25
Max. cable cross-section to motor,			16	16	35
brake and loadsharing [mm²]/[AWG][2)]			6	6	2
Min. cable cross-section to motor,			0.5	0.5	10
brake and loadsharing [mm2]/[AWG][4)]			20	20	8
Normal overload torque (110 %):					
Rated input current		$I_{L,N}$ [A] (550 V)	22	27	33
		$I_{L,N}$ [A] (600 V)	21	25	30
High overload torque (160 %):					
Rated input current		$I_{L,N}$ [A] (550 V)	18	22	27
		$I_{L,N}$ [A] (600 V)	16	21	25
Max. cable cross-section,			16	16	35
power [mm ²]/[AWG][2)]			6	6	2
Max. pre-fuses		[-]/UL[1)] [A]	30	35	45
Efficiency[3)]			0.96	0.96	0.96
Weight IP 20 EB		[kg]	23	23	30
Power loss at max. load		[W]	576	707	838
Enclosure				IP 20 / Nema 1	

1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Min. cable cross-section is the smallest cable cross-section allowed to be fitted on the terminals to comply with IP 20. Always comply with national and local regulations on min. cable cross-section.

Compact, Mains supply 3 x 525 - 600 V





According to international requirements	VLT type	5032	5042	5052	5062
Normal overload torque (110 %):					
Output current	$I_{VLT,N}$ [A] (550 V)	43	54	65	81
	$I_{VLT,MAX}$ (60 s) [A] (550 V)	47	59	72	89
	$I_{VLT,N}$ [A] (575 V)	41	52	62	77
	$I_{VLT,MAX}$ (60 s) [A] (575 V)	45	57	68	85
Output	$S_{VLT,N}$ [kVA] (550 V)	41	51	62	77
	$S_{VLT,N}$ [kVA] (575 V)	41	52	62	77
Typical shaft output	$P_{VLT,N}$ [kW]	30	37	45	55
Typical shaft output	$P_{VLT,N}$ [HP]	40	50	60	75
High overload torque (160 %):					
Output current	$I_{VLT,N}$ [A] (550 V)	34	43	54	65
	$I_{VLT,MAX}$ (60 s) [A] (550 V)	54	69	86	104
	$I_{VLT,N}$ [A] (575 V)	32	41	52	62
	$I_{VLT,MAX}$ (60 s) [A] (575 V)	51	66	83	99
Output	$S_{VLT,N}$ [kVA] (550 V)	32	41	51	62
	$S_{VLT,N}$ [kVA] (575 V)	32	41	52	62
Typical shaft output	$P_{VLT,N}$ [kW]	22	30	37	45
Typical shaft output	$P_{VLT,N}$ [HP]	30	40	50	60
Max. cable cross-section to motor, brake and loadsharing [mm²]/[AWG][2)5)]		35 2	50 1/0	50 1/0	50 1/0
Min. cable cross-section to motor, brake and loadsharing [mm²]/[AWG][4)]		10 8	16 6	16 6	16 6
Normal overload torque (110 %):					
Rated input current	$I_{L,N}$ [A] (550 V)	42	53	63	79
	$I_{L,N}$ [A] (600 V)	38	49	58	72
High overload torque (160 %):					
Rated input current	$I_{L,N}$ [A] (550 V)	33	42	53	63
	$I_{L,N}$ [A] (600 V)	30	38	49	58
Max. cable cross-section power[mm ²]/[AWG][2) 5)]		35 2	50 1/0	50 1/0	50 1/0
Max. pre-fuses	[-]/UL[1)] [A]	60	75	90	100
Efficiency[3)]		0.96	0.96	0.96	0.96
Weight IP 20 EB	[kg]	30	48	48	48
Power loss at max. load	[W]	1074	1362	1624	2016
Enclosure		IP 20 / Nema 1			

1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Min. cable cross-section is the smallest cable cross-section allowed to be fitted on the terminals to comply with IP 20. Always comply with national and local regulations on min. cable cross-section.
5. Aluminium cables with cross-section above 35 mm² must be connected by use of a Al-Cu connector.

■ Mains supply 3 x 525 - 690 V

According to international requirements		VLT type	5042	5052	5062	5072	5102
	Normal overload torque (110 %):						
	Output current	$I_{VLT,N}$ [A] (525-550 V)	56	76	90	113	137
		$I_{VLT, MAX}$ (60 s) [A] (525-550 V)	62	84	99	124	151
		$I_{VLT,N}$ [A] (551-690 V)	54	73	86	108	131
		$I_{VLT, MAX}$ (60 s) [A] (551-690 V)	59	80	95	119	144
	Output	$S_{VLT,N}$ [kVA] (550 V)	53	72	86	108	131
		$S_{VLT,N}$ [kVA] (575 V)	54	73	86	108	130
		$S_{VLT,N}$ [kVA] (690 V)	65	87	103	129	157
	Typical shaft output	[kW] (550 V)	37	45	55	75	90
		[HP] (575 V)	50	60	75	100	125
		[kW] (690 V)	45	55	75	90	110
	High overload torque (160 %):						
	Output current	$I_{VLT,N}$ [A] (525-550 V)	48	56	76	90	113
		$I_{VLT, MAX}$ (60 s) [A] (525-550 V)	72	84	114	135	170
		$I_{VLT,N}$ [A] (551-690 V)	46	54	73	86	108
		$I_{VLT, MAX}$ (60 s) [A] (551-690 V)	69	81	110	129	162
	Output	$S_{VLT,N}$ [kVA] (550 V)	46	53	72	86	108
		$S_{VLT,N}$ [kVA] (575 V)	46	54	73	86	108
		$S_{VLT,N}$ [kVA] (690 V)	55	65	87	103	129
	Typical shaft output	[kW] (550 V)	30	37	45	55	75
		[HP] (575 V)	40	50	60	75	100
		[kW] (690 V)	37	45	55	75	90
	Max. cable cross-section	[mm²][4,6]			2 x 70		
	to motor	[AWG][2,4,6]			2 x 2/0		
	Max. cable cross-section	[mm²][4,6]			2 x 70		
	to loadsharing and brake	[AWG][2,4,6]			2 x 2/0		
	Normal overload torque (110 %):						
	Rated input current	$I_{L,N}$ [A] (550 V)	60	77	89	110	130
		$I_{L,N}$ [A] (575 V)	58	74	85	106	124
		$I_{L,N}$ [A] (690 V)	58	77	87	109	128
	High overload torque (160 %):						
	Rated input current	$I_{L,N}$ [A] (550 V)	53	60	77	89	110
		$I_{L,N}$ [A] (575 V)	51	58	74	85	106
		$I_{L,N}$ [A] (690 V)	50	58	77	87	109
	Max. cable cross-section	[mm²][4,6]			2 x 70		
	power supply	[AWG][2,4,6]			2 x 2/0		
	Max. pre-fuses (mains) [-]/UL	[A][1]	125	160	200	200	250
	Efficiency[3]		0.97	0.97	0.98	0.98	0.98
	Power loss	Normal overload [W]	1458	1717	1913	2262	2662
		High overload [W]	1355	1459	1721	1913	2264
	Weight	IP 00 [kg]			82		
	Weight	IP 21/Nema1 [kg]			96		
	Weight	IP 54/Nema12 [kg]			96		
	Enclosure	IP 00, IP 21/Nema 1 and IP 54/Nema12					

1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Max. cable cross-section is the maximum possible cable cross-section allowed to be fitted on the terminals. Always comply with national and local regulations on min. cable cross-section.
5. Weight without shipping container.
6. Connection bolt power supply and motor: M10; Brake and loadsharing: M8

■ mains supply 3 x 525 - 690 V

According to international requirements	VLT type	5122	5152	5202	5252	5302	5352
Normal overload torque (110 %):							
Output current	$I_{VLT,N}$ [A] (525-550 V)	162	201	253	303	360	418
	$I_{VLT, MAX}$ (60 s) [A] (525-550 V)	178	221	278	333	396	460
	$I_{VLT,N}$ [A] (551-690 V)	155	192	242	290	344	400
	$I_{VLT, MAX}$ (60 s) [A] (551-690 V)	171	211	266	319	378	440
Output	$S_{VLT,N}$ [kVA] (550 V)	154	191	241	289	343	398
	$S_{VLT,N}$ [kVA] (575 V)	154	191	241	289	343	398
	$S_{VLT,N}$ [kVA] (690 V)	185	229	289	347	411	478
Typical shaft output	[kW] (550 V)	110	132	160	200	250	315
	[HP] (575 V)	150	200	250	300	350	400
	[kW] (690 V)	132	160	200	250	315	400
High overload torque (160 %):							
Output current	$I_{VLT,N}$ [A] (525-550 V)	137	162	201	253	303	360
	$I_{VLT, MAX}$ (60 s) [A] (525-550 V)	206	243	302	380	455	540
	$I_{VLT,N}$ [A] (551-690 V)	131	155	192	242	290	344
	$I_{VLT, MAX}$ (60 s) [A] (551-690 V)	197	233	288	363	435	516
Output	$S_{VLT,N}$ [kVA] (550 V)	131	154	191	241	289	343
	$S_{VLT,N}$ [kVA] (575 V)	130	154	191	241	289	343
	$S_{VLT,N}$ [kVA] (690 V)	157	185	229	289	347	411
Typical shaft output	[kW] (550 V)	90	110	132	160	200	250
	[HP] (575 V)	125	150	200	250	300	350
	[kW] (690 V)	110	132	160	200	250	315
Max. cable cross-section to motor	[mm²][4,6]	2 x 70			2 x 185		
	[AWG][2,4,6]	2 x 2/0			2 x 350 mcm		
Max. cable cross-section to loadsharing and brake	[mm²][4,6]	2 x 70			2 x 185		
	[AWG][2,4,6]	2 x 2/0			2 x 350 mcm		
Normal overload torque (110 %):							
Rated input current	$I_{L,N}$ [A] (550 V)	158	198	245	299	355	408
	$I_{L,N}$ [A] (575 V)	151	189	234	286	339	390
	$I_{L,N}$ [A] (690 V)	155	197	240	296	352	400
High overload torque (160 %):							
Rated input current	$I_{L,N}$ [A] (550 V)	130	158	198	245	299	355
	$I_{L,N}$ [A] (575 V)	124	151	189	234	286	339
	$I_{L,N}$ [A] (690 V)	128	155	197	240	296	352
Max. cable cross-section power supply	[mm²][4,6]	2 x 70			2 x 185		
	[AWG][2,4,6]	2 x 2/0			2 x 350 mcm		
Max. pre-fuses (mains) [-]/UL	[A][1]	315	350	350	400	500	550
Efficiency[3]		0,98					
Power loss	Normal overload [W]	3114	3612	4292	5155	5821	6149
	High overload [W]	2664	2952	3451	4275	4875	5185
Weight	IP 00 [kg]	82	91	112	123	138	151
Weight	IP 21/Nema1 [kg]	96	104	125	136	151	165
Weight	IP 54/Nema12 [kg]	96	104	125	136	151	165
Enclosure	IP 00, IP 21/Nema 1 and IP 54/Nema12						

1. For type of fuse see section *Fuses*
2. American Wire Gauge.
3. Measured using 30 m screened motor cables at rated load and rated frequency.
4. Max. cable cross-section is the maximum possible cable cross-section allowed to be fitted on the terminals. Always comply with national and local regulations on min. cable cross-section.
5. Weight without shipping container.
6. Connection bolt power supply and motor: M10; Brake and loadsharing: M8

■ Fuses

UL compliance

To comply with UL/cUL approvals, pre-fuses according to the table below must be used.

200-240 V

VLT	Bussmann	SIBA	Littel fuse	Ferraz-Shawmut
5001	KTN-R10	5017906-010	KLN-R10	ATM-R10 or A2K-10R
5002	KTN-R10	5017906-010	KLN-R10	ATM-R10 or A2K-10R
5003	KTN-R25	5017906-016	KLN-R15	ATM-R15 or A2K-15R
5004	KTN-R20	5017906-020	KLN-R20	ATM-R20 or A2K-20R
5005	KTN-R25	5017906-025	KLN-R25	ATM-R25 or A2K-25R
5006	KTN-R30	5012406-032	KLN-R30	ATM-R30 or A2K-30R
5008	KTN-R50	5014006-050	KLN-R50	A2K-50R
5011	KTN-R60	5014006-063	KLN-R60	A2K-60R
5016	KTN-R85	5014006-080	KLN-R80	A2K-80R
5022	KTN-R125	2028220-125	KLN-R125	A2K-125R
5027	KTN-R125	2028220-125	KLN-R125	A2K-125R
5032	KTN-R150	2028220-160	L25S-150	A25X-150
5042	KTN-R200	2028220-200	L25S-200	A25X-200
5052	KTN-R250	2028220-250	L25S-250	A25X-250

380-500 V

	Bussmann	SIBA	Littel fuse	Ferraz-Shawmut
5001	KTS-R6	5017906-006	KLS-R6	ATM-R6 or A6K-6R
5002	KTS-R6	5017906-006	KLS-R6	ATM-R6 or A6K-6R
5003	KTS-R10	5017906-010	KLS-R10	ATM-R10 or A6K-10R
5004	KTS-R10	5017906-010	KLS-R10	ATM-R10 or A6K-10R
5005	KTS-R15	5017906-016	KLS-R16	ATM-R16 or A6K-16R
5006	KTS-R20	5017906-020	KLS-R20	ATM-R20 or A6K-20R
5008	KTS-R25	5017906-025	KLS-R25	ATM-R25 or A6K-25R
5011	KTS-R30	5012406-032	KLS-R30	A6K-30R
5016	KTS-R40	5012406-040	KLS-R40	A6K-40R
5022	KTS-R50	5014006-050	KLS-R50	A6K-50R
5027	KTS-R60	5014006-063	KLS-R60	A6K-60R
5032	KTS-R80	2028220-100	KLS-R80	A6K-180R
5042	KTS-R100	2028220-125	KLS-R100	A6K-100R
5052	KTS-R125	2028220-125	KLS-R125	A6K-125R
5062	KTS-R150	2028220-160	KLS-R150	A6K-150R
5072	FWH-220	2028220-200	L50S-225	A50-P225
5102	FWH-250	2028220-250	L50S-250	A50-P250
5122*	FWH-300/170M3017	2028220-315	L50S-300	A50-P300
5152*	FWH-350/170M3018	2028220-315	L50S-350	A50-P350
5202*	FWH-400/170M4012	206xx32-400	L50S-400	A50-P400
5252*	FWH-500/170M4014	206xx32-500	L50S-500	A50-P500
5302*	FWH-600/170M4016	206xx32-600	L50S-600	A50-P600
5352	170M4017			
5452	170M6013			
5502	170M6013			
5552	170M6013			

* Circuit Breakers manufactured by General Electric, Cat. No. SKHA36AT0800, with rating plugs listed below can be used to meet UL-requirements:

5122	rating plug No.	SRPK800 A 300
5152	rating plug No.	SRPK800 A 400
5202	rating plug No.	SRPK800 A 400
5252	rating plug No.	SRPK800 A 500
5302	rating plug No.	SRPK800 A 600

525-600 V

	Bussmann	SIBA	Littel fuse	Ferraz-Shawmut
5001	KTS-R3	5017906-004	KLS-R003	A6K-3R
5002	KTS-R4	5017906-004	KLS-R004	A6K-4R
5003	KT-R5	5017906-005	KLS-R005	A6K-5R
5004	KTS-R6	5017906-006	KLS-R006	A6K-6R
5005	KTS-R8	5017906-008	KLS-R008	A6K-8R
5006	KTS-R10	5017906-010	KLS-R010	A6K-10R
5008	KTS-R15	5017906-016	KLS-R015	A6K-15R
5011	KTS-R20	5017906-020	KLS-R020	A6K-20R
5016	KTS-R30	5017906-030	KLS-R030	A6K-30R
5022	KTS-R35	5014006-040	KLS-R035	A6K-35R
5027	KTS-R45	5014006-050	KLS-R045	A6K-45R
5032	KTS-R60	5014006-063	KLS-R060	A6K-60R
5042	KTS-R75	5014006-080	KLS-R075	A6K-80R
5052	KTS-R90	5014006-100	KLS-R090	A6K-90R
5062	KTS-R100	5014006-100	KLS-R100	A6K-100R

525-600 V (UL) and 525-690 V (CE) drives

	Bussmann	SIBA	FERRAZ-SHAWMUT
5042	170M3013	2061032,125	6.6URD30D08A0125
5052	170M3014	2061032,16	6.6URD30D08A0160
5062	170M3015	2061032,2	6.6URD30D08A0200
5072	170M3015	2061032,2	6.6URD30D08A0200
5102	170M3016	2061032,25	6.6URD30D08A0250
5122	170M3017	2061032,315	6.6URD30D08A0315
5152	170M3018	2061032,35	6.6URD30D08A0350
5202	170M4011	2061032,35	6.6URD30D08A0350
5252	170M4012	2061032,4	6.6URD30D08A0400
5302	170M4014	2061032,5	6.6URD30D08A0500
5352	170M5011	2062032,55	6.6URD32D08A550

KTS-fuses from Bussmann may substitute KTN for 240 V drives.
FWH-fuses from Bussmann may substitute FWX for 240 V drives.

KLSR fuses from LITTEL FUSE may substitute KLNR fuses for 240 V drives.
L50S fuses from LITTEL FUSE may substitute L25S fuses for 240 V drives.

A6KR fuses from FERRAZ SHAWMUT may substitute A2KR for 240 V drives.
A50X fuses from FERRAZ SHAWMUT may substitute A25X for 240 V drives.

Non UL compliance

If UL/cUL is not to be complied with, we recommend the above mentioned fuses or:

VLT 5001-5027	200-240 V	type gG
VLT 5032-5052	200-240 V	type gR
VLT 5001-5062	380-500 V	type gG
VLT 5072-5102	380-500 V	type gR
VLT 5122-5302	380-500 V	type gG
VLT 5352-5552	380-500 V	type gR
VLT 5001-5062	525-600 V	type gG

Not following the recommendation may result in unnecessary damage of the drive in case of malfunction. Fuses must be designed for protection in a circuit capable of supplying a maximum of 100000 A_{rms} (symmetrical), 500/600 V maximum.

■ Mechanical dimensions

All the below listed measurements are in mm.

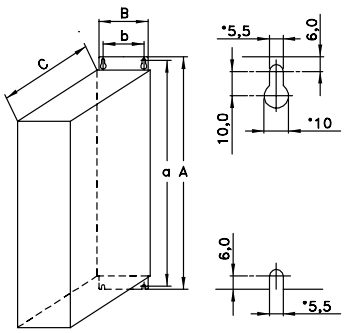
	A	B	C	D	a	b	ab/be	Type
Bookstyle IP 20								
5001 - 5003 200 - 240 V 5001 - 5005 380 - 500 V	395	90	260		384	70	100	A
5004 - 5006 200 - 240 V 5006 - 5011 380 - 500 V	395	130	260		384	70	100	A
Compact IP 00								
5032 - 5052 200 - 240 V	800	370	335		780	270	225	B
5122 - 5152 380 - 500 V	1046	408	373[1)]		1001	304	225	J
5202 - 5302 380 - 500 V	1327	408	373[1)]		1282	304	225	J
5352 - 5552 380 - 500 V	1547	585	494[1)]		1502	304	225	I
5042 - 5152 525 - 690 V	1046	408	373[1)]		1001	304	225	J
5202 - 5352 525 - 690 V	1327	408	373[1)]		1282	304	225	J
Compact IP 20								
5001 - 5003 200 - 240 V 5001 - 5005 380 - 500 V	395	220	160		384	200	100	C
5004 - 5006 200 - 240 V 5006 - 5011 380 - 500 V 5001 - 5011 525 - 600 V (IP 20 and Nema 1)	395	220	200		384	200	100	C
5008 200 - 240 V 5016 - 5022 380 - 500 V 5016 - 5022 525 - 600 V (Nema 1)	560	242	260		540	200	200	D
5011 - 5016 200 - 240 V 5027 - 5032 380 - 500 V 5027 - 5032 525 - 600 V (Nema 1)	700	242	260		680	200	200	D
5022 - 5027 200 - 240 V 5042 - 5062 380 - 500 V 5042 - 5062 525 - 600 V (Nema 1)	800	308	296		780	270	200	D
5072 - 5102 380 - 500 V	800	370	335		780	330	225	D
Compact Nema 1/IP20/IP21								
5032 - 5052 200 - 240 V	954	370	335		780	270	225	E
5122 - 5152 380 - 500 V	1208	420	373[1)]		1154	304	225	J
5202 - 5302 380 - 500 V	1588	420	373[1)]		1535	304	225	J
5352 - 5552 380 - 500 V	2000	600	494[1)]		-	-	225	H
5042 - 5152 525 - 690 V	1208	420	373[1)]		1154	304	225	J
5202 - 5352 525 - 690 V	1588	420	373[1)]		1535	304	225	J
Compact IP 54/Nema 12								
5001 - 5003 200 - 240 V 5001 - 5005 380 - 500 V	460	282	195	85	260	258	100	F
5004 - 5006 200 - 240 V 5006 - 5011 380 - 500 V	530	282	195	85	330	258	100	F
5008 - 5011 200 - 240 V 5016 - 5027 380 - 500 V	810	350	280	70	560	326	200	F
5016 - 5027 200 - 240 V 5032 - 5062 380 - 500 V	940	400	280	70	690	375	200	F
5032 - 5052 200 - 240 V	937	495	421	-	830	374	225	G
5072 - 5102 380 - 500 V	940	400	360	70	690	375	225	F
5122 - 5152 380 - 500 V	1208	420	373[1)]	-	1154	304	225	J
5202 - 5302 380 - 500 V	1588	420	373[2)]		1535	304	225	J
5352 - 5552 380 - 500 V	2000	600	494[1)]	-	-	-	225	H
5042 - 5152 525 - 690 V	1208	420	373[1)]	-	1154	304	225	J
5202 - 5352 525 - 690 V	1588	420	373[1)]		1535	304	225	J

ab: Minimum space above enclosure'

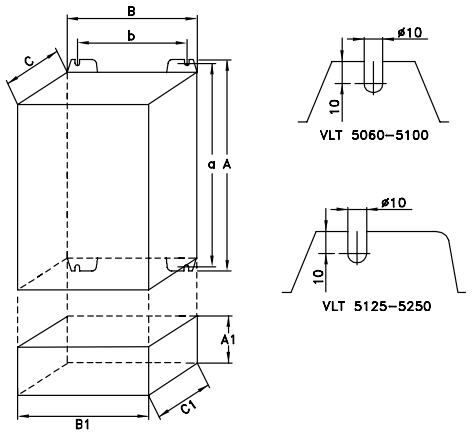
be: Minimum space below enclosure

1) With disconnect, add 44 mm.

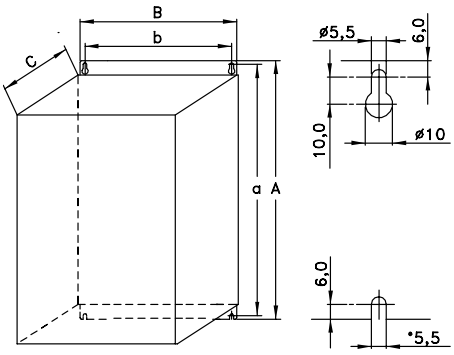
■ Mechanical dimensions, cont.



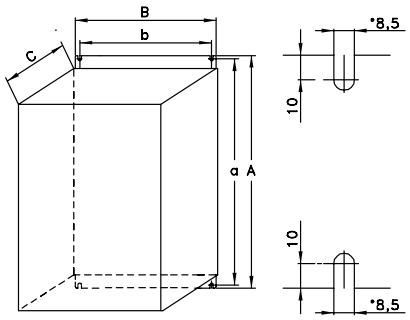
Type A, IP20



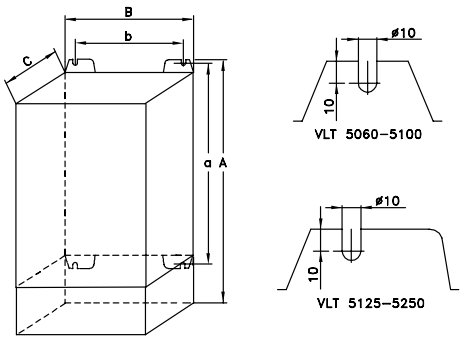
Type B, IP00
With option and enclosure IP20



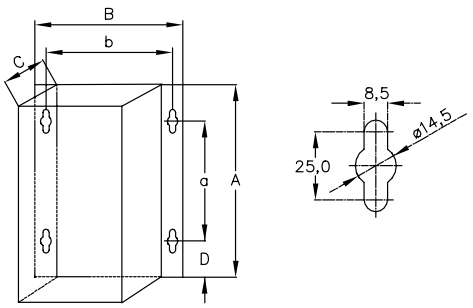
Type C, IP20



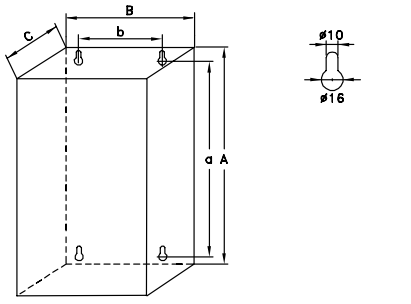
Type D, IP20



Type E, IP20/NEMA 1 with terminals



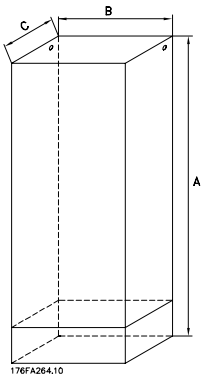
Type F, IP54



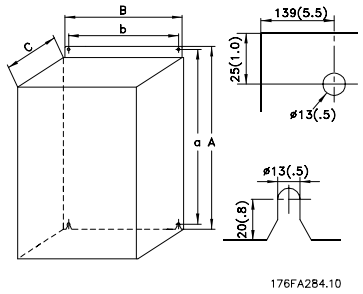
Type G, IP54

175ZA577.12

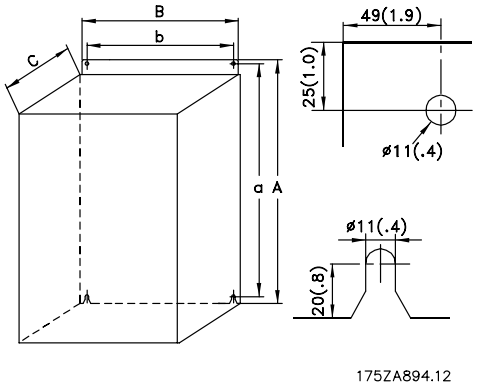
■ Mechanical dimensions (cont.)



Type H, IP 20, IP 54

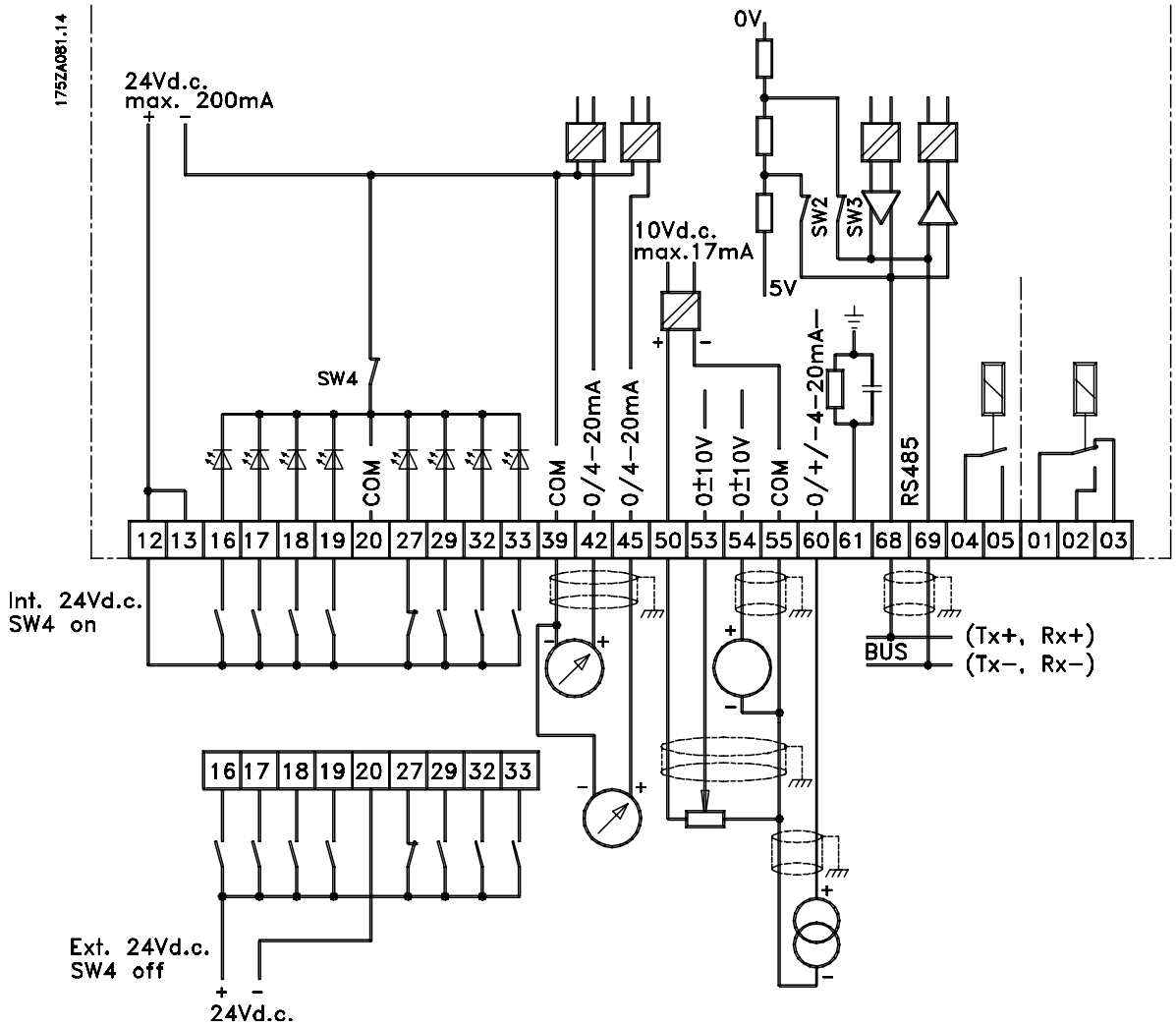


Type I, IP 00



Type J, IP 00, IP 21, IP 54

■ Electrical installation



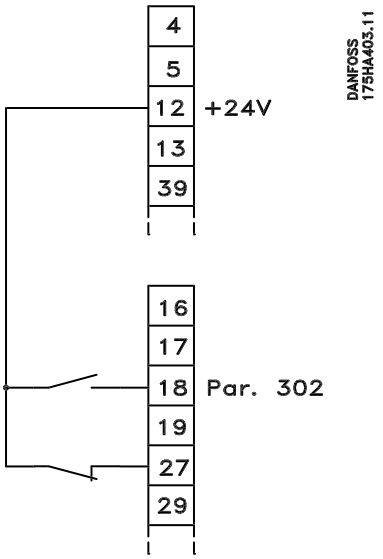
Conversion of analogue inputs

Current input signal to voltage input

0-20 mA ⇒ 0-10 V	Connect 510 ohms resistor between input terminal 53 and 55 (terminal 54 and 55) and adjust minimum and maximum values in parameters 309 and 310 (parameters 312 and 313).
4-20 mA ⇒ 2-10 V	

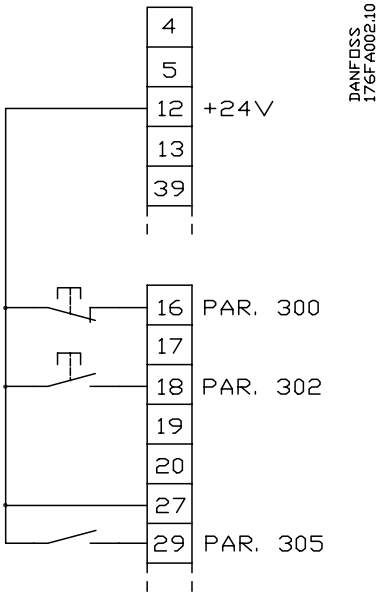
■ Connection examples

■ Two wire start/stop



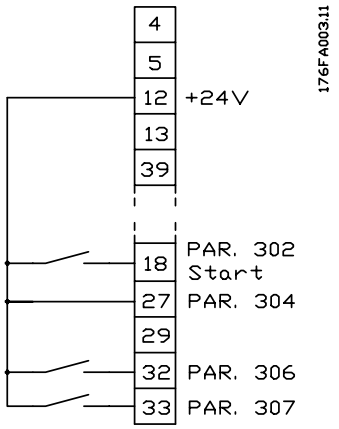
- Start/stop using terminal 18.
  Parameter 302 = *Start* [1]
- Quick-stop using terminal 27.
  Parameter 304 = *Coasting stop inverted* [0]

■ Pulse start/stop



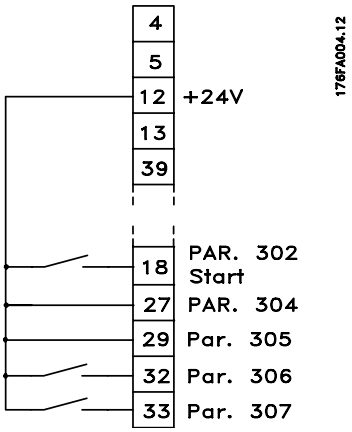
- Stop inverted by means of terminal 16.
  Parameter 300 = *Stop inverted* [2]
- Pulse start using terminal 18.
  Parameter 302 = *Pulse start* [2]
- Jog by means of terminal 29.
  Parameter 305 = *Jog* [5]

■ Setup change



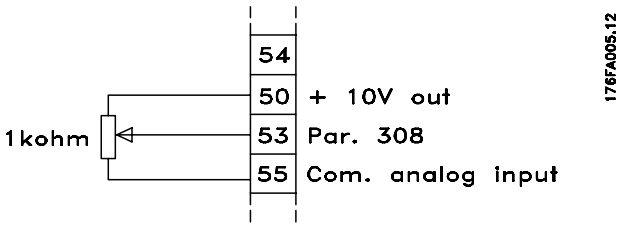
- Selection of setup using terminals 32 and 33.
  Parameter 306 =*Selection of setup, lsb* [10]
  Parameter 307 = *Selection of setup, msb* [10]
  Parameter 004 = *Multi-setup* [5].

■ Digital speed up/down



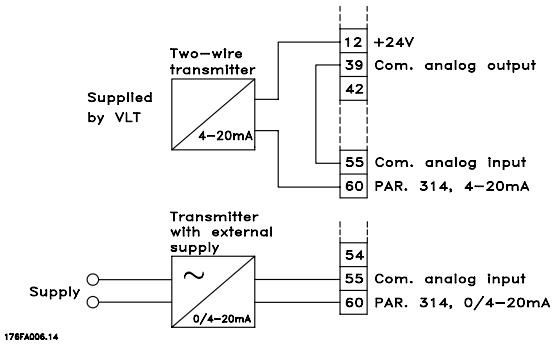
- Speed up and down using terminals 32 and 33.
  Parameter 306 = *Speed up* [9]
  Parameter 307 = *Speed down* [9]
  Parameter 305 = *Freeze reference* [7].

■ Potentiometer reference



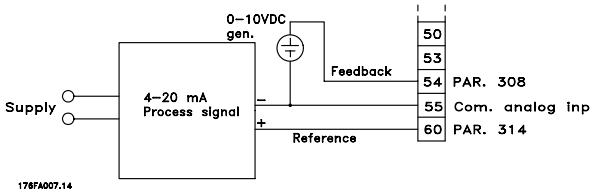
Parameter 308 = *Reference* [1]
Parameter 309 = *Terminal 53, min. scaling*
Parameter 310 = *Terminal 53, max. scaling*

■ Two-wire transmitter



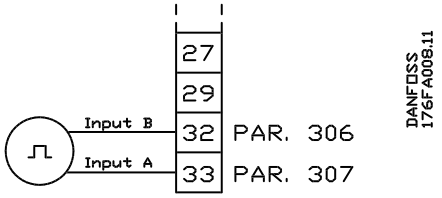
Parameter 314 = *Reference* [1], *Feedback* [2]
Parameter 315 = *Terminal 60, min. scaling*
Parameter 316 = *Terminal 60, max. scaling*

■ Current reference with speed feedback



Parameter 100 = *Speed control, closed loop*
Parameter 308 = *Feedback* [2]
Parameter 309 = *Terminal 53, min. scaling*
Parameter 310 = *Terminal 53, max. scaling*
Parameter 314 = *Reference* [1]
Parameter 315 = *Terminal 60, min. scaling*
Parameter 316 = *Terminal 60, max. scaling*

■ Encoder connection



Parameter 306 = *Encoder input B* [24]
Parameter 307 = *Encoder input A* [25]

If an encoder is connected that only has one output to *Encoder input A* [25], *Encoder input B* [24] must be set to *No function* [0].

■ General aspects of EMC emissions

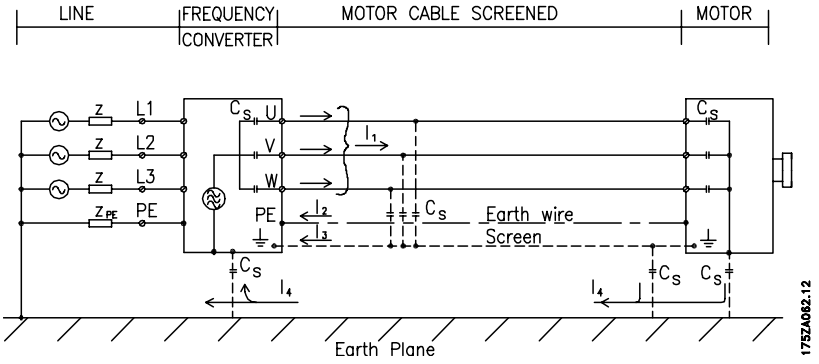
Electrical interference at frequences in the range 150 kHz to 30 MHz are usually conducted. Airborne interference from the drive system in the range 30 MHz to 1 GHz is generated from the inverter, the motor cable and the motor.

As the sketch below shows, capacitive currents in the motor cable together with a high dV/dt from the motor voltage generate leakage currents.

The use of a screened motor cable increases the leakage current (see figure below). This is because screened cables have higher capacitance to earth than unscreened cables. If the leakage current is not filtered, it will cause greater interference on the mains in the radio frequency range below approx. 5 MHz. Since the leakage current (I_1) is carried back to the unit through the screen (I_3), there will in principle only be a small electro-magnetic field (I_4) from the screened motor cable according to the below figure.

The screen reduces the radiated interference, but increases the low-frequency interference on the mains. The motor cable screen must be connected to the VLT enclosure as well as on the motor enclosure. The best way of doing this is by using integrated screen clamps so as to avoid twisted screen ends (pigtails). These increase the screen impedance at higher frequencies, which reduces the screen effect and increases the leakage current (I_4).

If a screened cable is used for Profibus, standard bus, relay, control cable, signal interface and brake, the screen must be mounted on the enclosure at both ends. In some situations, however, it will be necessary to break the screen to avoid current loops.



In the cases when the screen is to be placed on a mounting plate for the VLT frequency converter, the mounting plate must be made of metal, because the screen currents are to be conveyed back to the unit. It is also important to ensure good electrical contact from the mounting plate through the mounting screws to the VLT frequency converter chassis.

With respect to installation, it is generally less complicated to use unscreened cables than screened ones.

NB!:

Please note, however, that when unscreened cables are used, some emission requirements are not complied with, although the immunity requirements are complied with.

In order to reduce the interference level from the system overall (unit + installation) as far as possible, it is important to make motor and brake cables as short as possible. Cables with a sensitive signal level must not be alongside motor and brake cables. Radio interference higher than 50 MHz (airborne) will be generated especially by the control electronics.

EMC Test Results (Emission, Immunity)

The following test results have been obtained using a system with a VLT frequency converter (with options if relevant), a screened control cable, a control box with potentiometer, as well as a motor and motor cable.

VLT 5001-5011/380-500V VLT 5001-5006/200-240 V	Emission				
	Environment	Industrial environment		Housing, trades and light industries	
	Basic standard	EN 55011 Class A1		EN 55011 Class B1	
Setup	Motor cable	Conducted 150 kHz-30 MHz	Radiated 30 MHz-1 GHz	Conducted 150 kHz-30 MHz	Radiated 30 MHz-1 GHz
VLT 5000 with RFI filter option	300 m unscreened/unarmoured	Yes [3]	No	No	No
	50 m br. screened/armoured (Bookstyle 20m)	Yes	Yes	Yes [2]	No
	150m br. screened/armoured	Yes [1]	Yes [1]	No	No
VLT 5000 with RFI filter option (+ LC filter)	300 m unscreened/unarmoured	Yes	No	No	No
	50 m br. screened/armoured	Yes	Yes	Yes [2]	No
	150m br. screened/armoured	Yes	Yes	No	No

1) For VLT 5011/380-500 V and VLT 5006/200-240 V this is only complied with if a maximum braided screened/armoured cable of 100 m is used.

2) Does not apply to 5011/380-500 V and 5006/200-240 V

3) Depending on installation conditions

VLT 5016-5552/380-500 V VLT 5008-5052/200-240 V VLT 5042-5352/525-690 V	Emission				
	Environment	Industrial environment		Housing, trades and light industries	
	Basic standard	EN 55011 Class A1		EN 55011 Class B	
Setup	Motor cable	Conducted 150 kHz-30 MHz	Radiated 30 MHz-1 GHz	Conducted 150 kHz-30 MHz	Radiated 30 MHz-1 GHz
VLT 5000 without RFI filter option [4] [5]	300 unscreened/unarmoured	No	No	No	No
	150 m br. screened/armoured	No	Yes[6]	No	No
VLT 5000 with RFI filter option	300 m unscreened/unarmoured	Yes [2] [6]	No	No	No
	50 m br. screened/armoured	Yes	Yes[6]	Yes [1][3] [6]	No
	150 m br. screened/armoured	Yes[6]	Yes[6]	No	No

1) Does not apply to VLT 5122-5552 / 380-500 V.

2) Depending on installation conditions.

3) VLT 5032-5052 / 200-240 V with external filter.

4) VLT 5122-5552, 380-500 V, fulfils class A-2 at 50 m screened cable without RFI filter (typecode R0).

5) VLT 5042-5352, 525-690 V, fulfils class A2 at 150 m screened cable without RFI filter (R0), and class A1 at 30 m screened cable with RFI filter (R1).

6) Does not apply to VLT 5042-5352, 525-690 V.

In order to minimise the conducted noise to the mains supply and the radiated noise from the frequency converter system, the motor cables should be as short as possible and the screen ends should be made in accordance with the section on electrical installation.

■ Required compliance levels

Standard / environment	First environment Housing, trades and light industries		Second environment Industrial environment	
	Conducted	Radiated	Conducted	Radiated
EN 61000-6-3	Class B	Class B		
EN 61000-6-4			Class A-1	Class A-1
EN 61800-3 (restricted)	Class A-1	Class A-1	Class A-2	Class A-2
EN 61800-3 (unrestricted)	Class B	Class B	Class A-1	Class A-1

EN 55011: Threshold values and measuring methods for radio interference from industrial, scientific and medical (ISM) high-frequency equipment.

Class A-1: Equipment used in a industrial environment. Unrestricted distribution.

Class A-2: Equipment used in an industrial environment. Restricted distribution.

Class B: Equipment used in areas with a public supply network (dwellings, commerce and light industries). Unrestricted distribution.

■ EMC Immunity

In order to document immunity against electrical interference from electrical phenomena, the following immunity tests have been made on a system consisting of a frequency converter (with options, if relevant), a screened control cable and a control box with potentiometer, motor cable, and motor.

The tests were performed in accordance with the following basic standards:

- **EN 61000-4-2 (IEC 61000-4-2): Electrostatic discharges (ESD)**
  Simulation of electrostatic discharges from human beings.
- **EN 61000-4-3 (IEC 61000-4-3): Incoming electromagnetic field radiation, amplitude modulated**
  Simulation of the effects of radar and radio communication equipment as well as mobile communications.
- **EN 61000-4-4 (IEC 61000-4-4): Burst transients**
  Simulation of interference brought about by switching with a contactor, relays or similar devices.
- **EN 61000-4-5 (IEC 61000-4-5): Surge transients**
  Simulation of transients brouht e.g. by lightning that strikes near installations.
- **VDE 0160 class W2 test pulse: Mains transients**
  Simulation of high-energy transients brought about by main fuse breakage, switching of power factor correction capacitors, etc.
- **EN 61000-4-6 (IEC 61000-4-6): RF Common mode**
  Simulation of the effect from radio-transmitting equipment connected to connection cables.

See following EMC immunity form.

Immunity continued

Basic standard	Burst IEC 61000-4-4	Surge IEC 61000-4-5		ESD IEC 61000-4-2	Radiated electromagnetic field IEC 61000-4-3	Mains distortion VDE 0160	RF common mode voltage IEC 61000-4-6
Acceptance criterion	B	B		B	A		A
Port connection	CM	DM	CM		–	CM	CM
Line	OK	OK	–	–	–	OK	OK
Motor	OK	–	–	–	–	–	OK
Control lines	OK	–	OK	–	–	–	OK
Application and Fieldbus options	OK	–	OK	–	–	–	OK
Signal interface<3 m	OK	–	–	–	–	–	–
Enclosure	–	–	–	OK	OK	–	OK
Load sharing	OK	–	–	–	–	–	OK
Standard bus	OK	–	OK	–	–	–	OK
Brake	OK	–	–	–	–	–	OK
External 24 V DC	OK	–	OK	–	–	–	OK

DM: Differential mode

CM: Common mode

CCC: Capacitive clamp coupling

DCN: Direct coupling network

Immunity continued

Basic specifications	Burst IEC 61000-4-4	Surge IEC 61000-4-5	ESD IEC 61000-4-2	Radiated electromagnetic field IEC 61000-4-3	Mains distortion VDE 0160	RF common mode voltage IEC 61000-4-6
Line	4kV/5 kHz/DCN	2 kV/2Ω 4 kV/12Ω	–	–	2,3 x U_N[2]	10 V_{RMS}
Motor	4kV/5 kHz/CCC	– –	–	–	–	10 V_{RMS}
Control lines	2kV/5 kHz/CCC	– 2 kV/2Ω[1]	–	–	–	10 V_{RMS}
Application and Fieldbus options	2kV/5 kHz/CCC	– 2 kV/2Ω[1]	–	–	–	10 V_{RMS}
Signal interface <3 m	1kV/5 kHz/CCC	– –	–	–	–	10 V_{RMS}
Enclosure	–	– –	8 kV AD 6 kV CD	10 V/m	–	–
Load sharing	4kV/5 kHz/CCC	– –	–	–	–	10 V_{RMS}
Standard bus	2kV/5 kHz/CCC	– 4 kV/2Ω[1]	–	–	–	10 V_{RMS}
Brake	4kV/5 kHz/CCC	– –	–	–	–	10 V_{RMS}
External 24 V DC	2kV/5 kHz/CCC	– 4 kV/2Ω[1]	–	–	–	10 V_{RMS}

DM: Differential mode

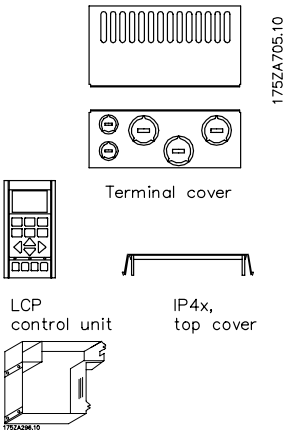
CM: Common mode

CCC: Capacitive clamp coupling

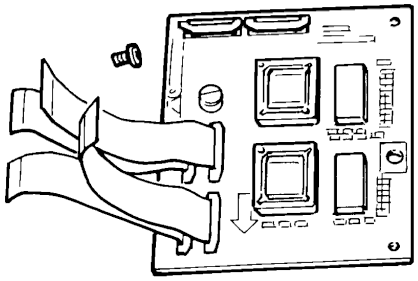
DCN: Direct coupling network

1. Injection on cable shield.
2. 2,3 x U_N: max. test pulse 380 V_{AC}: Class 2/1250 V_{PEAK}, 415 V_{AC}: Class 1/1350 V_{PEAK}

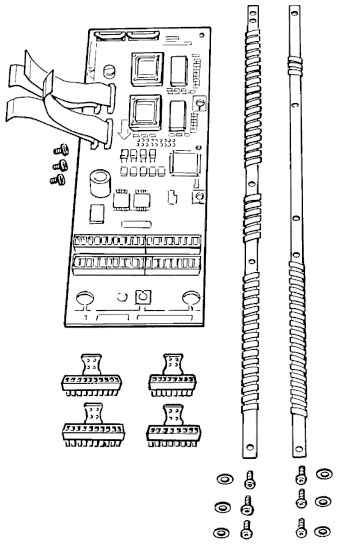
■ Accessories for VLT 5000 Series



IP 20 bottom cover



Memory option



Application option

■ LC filter module

The LC filter reduces the voltage rise time (dV/dt) and the ripple current (△I) to the motor, thereby making current and voltage almost sinusoidal. The acoustic motor noise is therefore reduced to a minimum.

See also instructions MI.56.DX.51.

■ LCP control unit

Control unit with display and keypad for programming VLT frequency converters. Available as an option for IP 00 and IP 20 units.
Enclosure: IP 65.

■ Remote-mounting kits for LCP

The remote kit option makes it possible to move the display from the frequency converter e.g. to the front panel of an integrated cabinet.

Technical data

Enclosure:	IP 65 front
Max. cable length between VLT and unit:	3 m
Communication std:	RS 422

Reference is also made to instructions MI.56.AX.51 (IP 20) and MI.56.GX.52 (IP 54).

■ IP 4x top cover

IP 4x top cover is an optional enclosure element available for IP 20 Compact units.
If an IP 4x top cover is used, an IP 20 unit is upgraded to comply with enclosure IP 4x from the top. In practice, this means that the unit complies with IP 40 on upper, horizontal surfaces.
A top cover is available for the following Compact units:
VLT type 5001-5006, 200-240 V
VLT type 5001-5011, 380-500 V
VLT type 5001-5011, 525-600 V

■ Terminal cover

Using a terminal cover, it is possible to field mount an IP 20 unit, type VLT 5008-5052.
A terminal cover is available for the following compact units:
VLT type 5008-5027, 200-240 V
VLT type 5016-5102, 380-500 V
VLT type 5016-5062, 525-600 V

■ Contactors

Danfoss also manufactures a complete range of contactors.

■ Brake resistors

Brake resistors are used in applications where high dynamics are needed or a high inertia load has to be stopped. The brake resistor is used to remove the energy, see also Instructions MI.50.SX.YY and MI.90.FX.YY.

■ Harmonic filter

Harmonic currents do not directly affect the electricity consumption but has an impact on following conditions:

Higher total current to be handled by the installations
- Increases load on transformer (sometimes it will require a larger transformer, particular at retrofit)
- Increases heat losses in transformer and installation
- In some cases demands larger cables, switches and fuses

Higher voltage distortion due to higher current
- Increase risk for disturbing electronic equipment connected to same grid

A high percentage of rectifier load from eg frequency converters, will increase the harmonic current, which must be reduced to avoid the above consequences. Therefore the frequency converter has as standard, built in DC coils reducing the total current with about 40% (compared to devices without any arrangement for harmonic suppression), down to 40-45% ThiD.

In some cases there is a need for further suppression (eg retrofit with frequency converters). For this purpose Danfoss can offer two advanced harmonic filters AHF05 and AHF10, bringing the harmonic current down to around 5% and 10% respectively. For further details see instruction MG.80.BX.YY.

■ PC Software tools

PC Software - MCT 10

All drives are equipped with a serial communication port. We provide a PC tool for communication

between PC and frequency converter, VLT Motion Control Tool MCT 10 Set-up Software.

MCT 10 Set-up Software

MCT 10 has been designed as an easy to use interactive tool for setting parameters in our frequency converters. The MCT 10 Set-up Software will be useful for:

- Planning a communication network off-line. MCT 10 contains a complete frequency converter database
- Commissioning frequency converters on line
- Saving settings for all frequency converters
- Replacing a drive in a network
- Expanding an existing network
- Future developed drives will be supported

MCT 10 Set-up Software support Profibus DP-V1 via a Master class 2 connection. It makes it possible to on line read/write parameters in a frequency converter via the Profibus network. This will eliminate the need for an extra communication network.

The MCT 10 Set-up Software Modules

The following modules are included in the software package:

MCT 10 Set-up Software

Setting parameters

Copy to and from frequency converters

Documentation and print out of parameter settings incl. diagrams

SyncPos

Creating SyncPos programme

Ordering number:

Please order your CD containing MCT 10 Set-up Software using code number 130B1000.

■ Ordering numbers, misc. hardware:

Type	Description	Ordering no.
IP 4x top cover/NEMA 1 kit[1)]	Option, VLT 5001-5006, 200-240 V	175Z0928
IP 4x top cover/NEMA 1 kit[1)]	Option, VLT 5001-5011, 380-500 V and 525-600 V	175Z0928
NEMA 12 bonding plate[2)]	Option, VLT 5001-5006, 200-240 V	175H4195
NEMA 12 bonding plate[2)]	Option, VLT 5001-5011, 380-500 V	175H4195
IP 20 terminal cover	Option, VLT 5008-5016, 200-240 V	175Z4622
IP 20 terminal cover	Option, VLT 5022-5027, 200-240 V	175Z4623
IP 20 terminal cover	Option, VLT 5016-5032, 380-500 V and 525-600 V	175Z4622
IP 20 terminal cover	Option, VLT 5042-5062, 380-500 V and 525-600 V	175Z4623
IP 20 terminal cover	Option, VLT 5072-5102, 380-500 V	175Z4280
IP 20 bottom cover	VLT 5032-5052, 200 - 240 V	176F1800
Terminal Adapter Kit	VLT 5032-5052, 200 - 240 V IP 00/Nema 1(IP 20), ST	176F1805
Terminal Adapter Kit	VLT 5032-5052, 200 - 240 V IP 00/Nema 1(IP 20), SB	176F1806
Terminal Adapter Kit	VLT 5032-5052, 200 - 240 V IP 00/Nema 1(IP 20), EB	176F1807
Terminal Adapter Kit	VLT 5032-5052, 200 - 240 V IP 54, ST	176F1808
Terminal Adapter Kit	VLT 5032-5052, 200 - 240 V IP 54, SB	176F1809
Encoder converter / 5 V TTL Linedriver / 24 V DC		175Z1929

Rittal Installation Kits

Type	Description	Order No.
Rittal TS8 enclosure for IP00[3)]	Installation kit for 1800mm high enclosure, VLT5122-5152; 380-500V, VLT 5042-5152, 525-690V	176F1824
Rittal TS8 enclosure for IP00[3)]	Installation kit for 2000mm high enclosure, VLT5122-5152, 380-500V; VLT 5042-5152, 525-690V	176F1826
Rittal TS8 enclosure for IP00[3)]	Installation kit for 1800mm high enclosure, VLT5202-5302, 380-500V; VLT 5202-5352, 525-690V	176F1823
Rittal TS8 enclosure for IP00[3)]	Installation kit for 2000mm high enclosure, VLT5202-5302, 380-500V; VLT 5202-5352, 525-690V	176F1825
Rittal TS8 enclosure for IP00[3)]	Installation kit for 2000mm high enclosure, VLT5352-5552, 380-500V	176F1850
Floor stand for IP21 and IP54 enclosure[3)]	Option, VLT5122-5302, 380-500V; VLT 5042-5352, 525-690V	176F1827
Mains shield kit	Protection kit:: VLT 5122-5302, 380-500 V VLT 5042-5352, 525-690 V	176F0799
	Protection kit:: VLT 5352-5552, 380-500 V	176F1851

[1)] IP 4xNEMA top cover is for Compact IP 20 units only and is only intended for horizontal surfaces that comply with IP 4x. The kit also contains a bonding plate (UL).
[2)] NEMA 12 bonding plate (UL) is for compact IP 54 units only.
[3)] For details: See High Power Installation Guide, MI.90.JX.YY.

■ Ordering numbers, control card options, etc.:

LCP:

Type	Description	Ordering no.	
IP 65 LCP option	Separate LCP, only for IP 20 units	175Z0401	
LCP remote-mounting kit/IP00/IP20/NEMA 1	Remote-mounting kit for LCP, for IP 00/20 units	175Z0850	incl. 3 m cable
LCP remote-mounting kit IP 54	Remote-mounting kit for LCP, for IP 54 units	175Z7802	incl. 3 m cable
Cable for LCP	Separate cable	175Z0929	3 m cable

LCP: Control unit with display and keypad.
Supplied excl. LCP.

1. IP 4xNEMA 1 top cover is for Compact IP 20 units only and is only intended for horizontal surfaces that comply with IP 4x. The kit also contains a bonding plate (UL).
2. NEMA 12 bonding plate (UL) is for compact IP 54 units only.

Fieldbus options and accessories:

Profibus:

Type	Description	Uncoated Ordering no.	Coated Ordering no.
Profibus option DP V0/V1	Incl. memory option	175Z0404	175Z2625
Profibus option DP V0/V1	excl. memory option	175Z0402	
Profibus option DP V0/FMS	incl. memory option	175Z3722	175Z3723

Type	Description	Ordering no.
Profibus Sub D9 Connector for IP 20 / IP 00	VLT 5001-5027, 200-240 V VLT 5001-5102, 380-500 V VLT 5001-5062, 525-600 V	175Z3568
	VLT 5032-5052, 200-240 V	176F1822

LonWorks:

LonWorks option, Free topology	Incl. memory option	176F1500	176F1503
LonWorks option, Free topology	excl. memory option	176F1512	
LonWorks option, 78 KBPS	Incl. memory option	176F1501	176F1504
LonWorks option, 78 KBPS	excl. memory option	176F1513	
LonWorks option, 1.25 MBPS	Incl. memory option	176F1502	176F1505
LonWorks option, 1.25 MBPS	excl. memory option	176F1514	

DeviceNet:

DeviceNet option	Incl. memory option	176F1580	176F1581
DeviceNet option	excl. memory option	176F1584	

Modbus:

Modbus Plus for Compact units	Incl. memory option	176F1551	176F1553
Modbus Plus for Compact units	Excl. memory option	176F1559	
Modbus Plus for Bookstyle units	Incl. memory option	176F1550	176F1552
Modbus Plus for Bookstyle units	Excl. memory option	176F1558	
Modbus RTU	Not factory mounted	175Z3362	

Interbus:

Interbus	Incl. memory option	175Z3122	175Z3191
Interbus	Excl. memory option	175Z2900	

Application options:

Programmable SyncPos controller	Application option	175Z0833	175Z3029
Synchronising controller	Application option	175Z3053	175Z3056
Positioning controller	Application option	175Z3055	175Z3057
Relay card option	Application option	175Z2500	175Z2901
Winder Option	Not factory mounted, SW version 3.40	175Z3245	
Ring Spinning Option	Not factory mounted, SW version 3.41	175Z3463	
Wobble Option	Not factory mounted, SW version 3.41	175Z3467	

Options can be ordered as factory built-in options, see ordering information.
For information on fieldbus and application option combatibility with older software versions, please contact your Danfoss supplier.
If the Fieldbus options are to be used without application option a version with memory option must be ordered.

■ LC filters for VLT 5000

When a motor is controlled by a frequency converter, resonance noise will be heard from the motor. This noise, which is the result of the design of the motor, arises every time one of the inverter switches in the frequency converter is activated. The frequency of the resonance noise thus corresponds to the switching frequency of the frequency converter.

For the VLT 5000 Series, Danfoss is able to supply an LC filter to dampen the acoustic motor noise.

The filter reduces the ramp-up time of the voltage, the peak load voltage U_{PEAK} and the ripple current ΔI to the motor, which means that current and voltage become almost sinusoidal. Consequently, the acoustic motor noise is reduced to a minimum.

Because of the ripple current in the coils, there will be some noise from the coils. This problem can be solved by integrating the filter in a cabinet or similar.

■ Ordering numbers, LC filter modules

Mains supply 3 x 200-240 V

LC filter for VLT type	LC filter enclosure	Rated current at 200 V	Max. torque at CT/VT	Max. output frequency	Power dissipation	Ordering no.
High overload torque						
5001-5003	Bookstyle IP 20	7.8 A	160%	120 Hz		175Z0825
5004-5006	Bookstyle IP 20	15.2 A	160%	120 Hz		175Z0826
5001-5006	Compact IP 20	15.2 A	160%	120 Hz		175Z0832
5008	Compact IP 00	25 A	160%	60 Hz	85 W	175Z4600
5011	Compact IP 00	32 A	160%	60 Hz	90 W	175Z4601
5016	Compact IP 00	46 A	160%	60 Hz	110 W	175Z4602
5022	Compact IP 00	61 A	160%	60 Hz	170 W	175Z4603
5027	Compact IP 00	73 A	160%	60 Hz	250 W	175Z4604
5032	Compact IP 20	88 A	150 %	60 Hz		175Z4700
5045	Compact IP 20	115 A	150 %	60 Hz		175Z4702
5052	Compact IP 20	143 A	150 %	60 Hz		175Z4702
Normal overload torque						
5008	Compact IP 00	32 A	110%	60 Hz	90 W	175Z4601
5011	Compact IP 00	46 A	110%	60 Hz	110 W	175Z4602
5016	Compact IP 00	61 A	110%	60 Hz	170 W	175Z4603
5022	Compact IP 00	73 A	110%	60 Hz	250 W	175Z4604
5027	Compact IP 00	88 A	110%	60 Hz	320 W	175Z4605
5032	Compact IP 20	115 A	110 %	60 Hz		175Z4702
5042	Compact IP 20	143 A	110 %	60 Hz		175Z4702
5052	Compact IP 20	170 A	110 %	60 Hz		175Z4703

NB!:
When using LC-filters, the switching frequency must be 4.5 kHz (see parameter 411).

Mains supply 3 x 380 - 500 V

LC filter for VLT type	LC filter enclosure	Rated current at 400/500 V	Max. torque at CT/VT	Max. output frequency	Power dissipation	Ordering no.
High overload torque						
5001-5005	Bookstyle IP 20	7.2 A / 6.3 A	160%	120 Hz		175Z0825
5006-5011	Bookstyle IP 20	16 A / 14.5 A	160%	120 Hz		175Z0826
5001-5011	Compact IP 20	16 A / 14.5 A	160%	120 Hz		175Z0832
5016	Compact IP 00	24 A / 21.7 A	160%	60 Hz	170 W	175Z4606
5022	Compact IP 00	32 A / 27.9 A	160%	60 Hz	180 W	175Z4607
5027	Compact IP 00	37.5 A / 32 A	160%	60 Hz	190 W	175Z4608
5032	Compact IP 00	44 A / 41.4 A	160%	60 Hz	210 W	175Z4609
5042	Compact IP 00	61 A / 54 A	160%	60 Hz	290 W	175Z4610
5052	Compact IP 00	73 A / 65 A	160%	60 Hz	410 W	175Z4611
5062	Compact IP 20	90 A / 80 A	160 %	60 Hz	400 W	175Z4700
5072	Compact IP 20	106 A / 106 A	160 %	60 Hz	500 W	175Z4701
5102	Compact IP 20	147 A / 130 A	160 %	60 Hz	600 W	175Z4702
5122	Compact IP 20	177 A / 160 A	160 %	60 Hz	750 W	175Z4703
5152	Compact IP 20	212 A / 190 A	160 %	60 Hz	750 W	175Z4704
5202	Compact IP 20	260 A / 240 A	160 %	60 Hz	900 W	175Z4705
5252	Compact IP 20	315 A / 302 A	160 %	60 Hz	1000 W	175Z4706
5302	Compact IP 20	395 A / 361 A	160 %	60 Hz	1100 W	175Z4707
5352	Compact IP 20	480 A / 443 A	160 %	60 Hz	1700 W	175Z3139
5452	Compact IP 20	600 A / 540 A	160 %	60 Hz	2100 W	175Z3140
5502	Compact IP 20	658 A / 590 A	160 %	60 Hz	2100 W	175Z3141
5552	Compact IP 20	745 A / 678 A	160 %	60 Hz	2500 W	175Z3142
Normal overload torque						
5016	Compact IP 00	32 A / 27.9 A	110%	60 Hz	180 W	175Z4607
5022	Compact IP 00	37.5 A / 32 A	110%	60 Hz	190 W	175Z4608
5027	Compact IP 00	44 A / 41.4 A	110%	60 Hz	210 W	175Z4609
5032	Compact IP 00	61 A / 54 A	110%	60 Hz	290 W	175Z4610
5042	Compact IP 00	73 A / 65 A	110%	60 Hz	410 W	175Z4611
5052	Compact IP 00	90 A / 78 A	110%	60 Hz	480 W	175Z4612
5062	Compact IP 20	106 A / 106 A	110 %	60 Hz	500 W	175Z4701
5072	Compact IP 20	147 A / 130 A	110 %	60 Hz	600 W	175Z4702
5102	Compact IP 20	177 A / 160 A	110 %	60 Hz	750 W	175Z4703
5122	Compact IP 20	212 A / 190 A	110 %	60 Hz	750 W	175Z4704
5152	Compact IP 20	260 A / 240 A	110 %	60 Hz	900 W	175Z4705
5202	Compact IP 20	315 A / 302 A	110 %	60 Hz	1000 W	175Z4706
5252	Compact IP 20	368 A / 361 A	110 %	60 Hz	1100 W	175Z4707
5302	Compact IP 20	480 A / 443 A	110 %	60 Hz	1700 W	175Z3139
5352	Compact IP 20	600 A / 540 A	110 %	60 Hz	2100 W	175Z3140
5452	Compact IP 20	658 A / 590 A	110 %	60 Hz	2100 W	175Z3141
5502	Compact IP 20	745 A / 678 A	110 %	60 Hz	2500 W	175Z3142
5552	Compact IP 20	800 A / 730 A	110%	60 Hz	Please contact Danfoss	

LC filters for VLT 5001-5062, 525 - 600 V, please contact Danfoss.

NB!:
When using LC-filters, the switching frequency must be 4.5 kHz (see parameter 411).
VLT 5352-5502 LC filters can be operated at 3 kHz switching frequency. Use 60 ° AVM switch pattern.

Mains supply 3 x 690 V						
160% overload torque	110% overload torque	Rated Current at 690 V	Max. output frequency (Hz)	Power dissipation (W)	Ordering no. IP00	Ordering no. IP20
5042		46	60	240	130B2223	130B2258
5052	5042	54	60	290	130B2223	130B2258
5062	5052	73	60	390	130B2225	130B2260
5072	5062	86	60	480	130B2225	130B2260
5102	5072	108	60	600	130B2226	130B2261
5122	5102	131	60	550	130B2228	130B2263
5152	5122	155	60	680	130B2228	130B2263
5202	5152	192	60	920	130B2229	130B2264
5252	5202	242	60	750	130B2231	130B2266
5302	5252	290	60	1000	130B2231	130B2266
5352	5302	344	60	1050	130B2232	130B2267
	5352	400	60	1150	130B2234	130B2269

dU/dt filters for VLT 5000

The dU/dt filters reduce dU/dt to approx. 500 V / µsec. These filters do not reduce noise or Upeak.

NB!:
When using dU/dt filters, the switching frequency must be 1.5 kHz (see parameter 411).

Mains supply 3 x 690 V						
160% overload torque	110% overload torque	Rated Current at 690 V	Max. output frequency (Hz)	Power dissipation (W)	Ordering no. IP 00	Ordering no. IP20
5042		46	60	85	130B2153	130B2187
5052	5042	54	60	90	130B2154	130B2188
5062	5052	73	60	100	130B2155	130B2189
5072	5062	86	60	110	130B2156	130B2190
5102	5072	108	60	120	130B2157	130B2191
5122	5102	131	60	150	130B2158	130B2192
5152	5102	155	60	180	130B2159	130B2193
5202	5152	192	60	190	130B2160	130B2194
5252	5202	242	60	210	130B2161	130B2195
5302	5252	290	60	350	130B2162	130B2196
5352	5302	344	60	480	130B2163	130B2197
	5352	400	60	540	130B2165	130B2199

■ Brake resistors, VLT 5001 - 5052 / 200 - 240 V

Standard brake resistors

	10% duty cycle			40% duty cycle		
	Resistance	Power	Code No.	Resistance	Power	Code No.
VLT	[ohm]	[kW]		[ohm]	[kW]	
5001	145	0.065	175U1820	145	0.260	175U1920
5002	90	0.095	175U1821	90	0.430	175U1921
5003	65	0.250	175U1822	65	0.80	175U1922
5004	50	0.285	175U1823	50	1.00	175U1923
5005	35	0.430	175U1824	35	1.35	175U1924
5006	25	0.8	175U1825	25	3.00	175U1925
5008	20	1.0	175U1826	20	3.50	175U1926
5011	15	1.8	175U1827	15	5.00	175U1927
5016	10	2.8	175U1828	10	9.0	175U1928
5022	7	4.0	175U1829	7	10.0	175U1929
5027	6	4.8	175U1830	6	12.7	175U1930
5032	4.7	6	175U1954	Not available	Not available	Not available
5042	3.3	8	175U1955	Not available	Not available	Not available
5052	2.7	10	175U1956	Not available	Not available	Not available

See instruction MI.90.FX.YY for further information.

Flatpack brake resistors for horizontal conveyors

VLT type	Motor [kW]	Resistor [ohm]	Size	Order number	Max. duty cycle [%]
5001	0.75	150	150 Ω 100 W	175U1005	14.0
5001	0.75	150	150 Ω 200 W	175U0989	40.0
5002	1.1	100	100 Ω 100 W	175U1006	8.0
5002	1.1	100	100 Ω 200 W	175U0991	20.0
5003	1.5	72	72 Ω 200 W	175U0992	16.0
5004	2.2	47	50 Ω 200 W	175U0993	9.0
5005	3	35	35 Ω 200 W	175U0994	5.5
5005	3	35	72 Ω 200 W	2 x 175U0992[1]	12.0
5006	4	25	50 Ω 200 W	2 x 175U0993[1]	11.0
5008	5.5	20	40 Ω 200 W	2 x 175U0996[1]	6.5
5011	7.5	13	27 Ω 200 W	2 x 175U0995[1]	4.0

1. Order 2 pcs.

Mounting angle for flatpack resistor 100 W 175U0011
Mounting angle for flatpack resistor 200 W 175U0009
Mounting frame for 1 resistor narrow (slim bookstyle) 175U0002
Mounting frame for 2 resistors narrow (slim bookstyle) 175U0004
Mounting frame for 2 resistors broad (wide bookstyle) 175U0003

See *Instruction MI.50.BX.YY* for further information.

■ Ordering numbers, Brake resistors, VLT 5001 - 5552 / 380 - 500 V

Standard brake resistors

	10% duty cycle			40% duty cycle		
	Resistance	Power	Code No.	Resistance	Power	Code No.
VLT	[ohm]	[kW]		[ohm]	[kW]	
5001	620	0.065	175U1840	620	0.260	175U1940
5002	425	0.095	175U1841	425	0.430	175U1941
5003	310	0.250	175U1842	310	0.80	175U1942
5004	210	0.285	175U1843	210	1.35	175U1943
5005	150	0.430	175U1844	150	2.0	175U1944
5006	110	0.60	175U1845	110	2.4	175U1945
5008	80	0.85	175U1846	80	3.0	175U1946
5011	65	1.0	175U1847	65	4.5	175U1947
5016	40	1.8	175U1848	40	5.0	175U1948
5022	30	2.8	175U1849	30	9.3	175U1949
5027	25	3.5	175U1850	25	12.7	175U1950
5032	20	4.0	175U1851	20	13.0	175U1951
5042	15	4.8	175U1852	15	15.6	175U1952
5052	12	5.5	175U1853	12	19.0	175U1953
5062	9.8	15	175U2008	9.8	38.0	175U2008
5072	7.3	13	175U0069	5.7	38.0	175U0068
5102	5.7	15	175U0067	4.7	45.0	175U0066
5122[2)]	3.8	22	175U1960			
5152[2)]	3.2	27	175U1961			
5202[2)]	2.6	32	175U1962			
5252[2)]	2.1	39	175U1963			
5302[2)]	1.65	56	2 x 175U1061[1)]			
5352-5552[2)]	2.6	72	2 x 175U1062[1) 3)]			

1. Order 2 pcs.
2. Resistors selected for 300 second cycle.
3. Rating fulfilled up to VLT 5452, the torque is reduced for VLT 5502 and VLT 5552.

See *Instruction MI.90.FX.YY* for further information.

Flatpack brake resistors for horizontal conveyors

VLT type	Motor [kW]	Resistor [ohm]	Size	Order number	Max. duty cycle [%]
5001	0.75	630	620 Ω 100 W	175U1001	14.0
5001	0.75	630	620 Ω 200 W	175U0982	40.0
5002	1.1	430	430 Ω 100 W	175U1002	8.0
5002	1.1	430	430 Ω 200 W	175U0983	20.0
5003	1.5	320	310 Ω 200 W	175U0984	16.0
5004	2.2	215	210 Ω 200 W	175U0987	9.0
5005	3	150	150 Ω 200 W	175U0989	5.5
5005	3	150	300 Ω 200 W	2 x 175U0985[1]	12.0
5006	4	120	240 Ω 200 W	2 x 175U0986[1]	11.0
5008	5.5	82	160 Ω 200 W	2 x 175U0988[1]	6.5
5011	7.5	65	130 Ω 200 W	2 x 175U0990[1]	4.0

1. Order 2 pcs.

Mounting angle for flatpack resistor 100 W 175U0011.
Mounting angle for flatpack resistor 200 W 175U0009.
Mounting frame for 1 resistor narrow (slim bookstyle) 175U0002.
Mounting frame for 2 resistors narrow (slim bookstyle) 175U0004.
Mounting frame for 2 resistors broad (wide bookstyle) 175U0003.
See *Instruction MI.50.BX.YY* for further information.
For VLT 5001-5062, 550-600 V please contact Danfoss.

■ Line reactors for load sharing applications

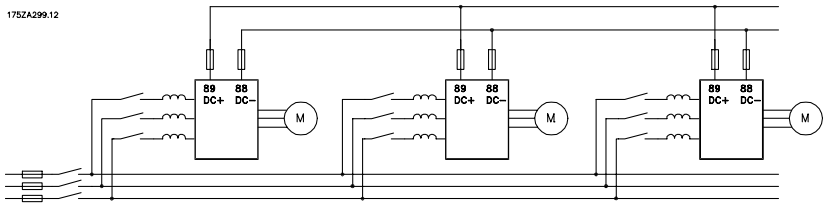
Line reactors are used when connecting frequency converters together in a load sharing application.

200 - 240 V units

VLT type	Nominal power at CT [kW]	Input current [A]	Voltage drop [%]	Inductivity [mH]	Ordering number
5001	0.75	3.4	1.7	1.934	175U0021
5002	1.10	4.8	1.7	1.387	175U0024
5003	1.50	7.1	1.7	1.050	175U0025
5004	2.20	9.5	1.7	0.808	175U0026
5005	3.0	11.5	1.7	0.603	175U0028
5006	4.0	14.5	1.7	0.490	175U0029
5008	5.5	32.0	1.7	0.230	175U0030
5011	7.5	46.0	1.7	0.167	175U0032
5016	11.0	61.0	1.7	0.123	175U0034
5022	15.0	73.0	1.7	0.102	175U0036
5027	18.5	88.0	1.7	0.083	175U0047

380 - 500 V units

VLT type	Nominal power at CT [kW]	Input current [A]	Voltage drop [%]	Inductivity [mH]	Ordering number
5001	0.75	2.3	1	3.196	175U0015
5002	1.1	2.6	1	2.827	175U0017
5003	1.5	3.8	1	1.934	175U0021
5004	2.2	5.3	1	1.387	175U0024
5005	3	7.0	1	1.050	175U0025
5006	4	9.1	1	0.808	175U0026
5008	5.5	12.2	1	0.603	175U0028
5011	7.5	15.0	1	0.490	175U0029
5016	11	32.0	1	0.230	175U0030
5022	15	37.5	1	0.196	175U0031
5027	18.5	44.0	1	0.167	175U0032
5032	22	60.0	1	0.123	175U0034
5042	30	72.0	1	0.102	175U0036
5052	37	89.0	1	0.083	175U0047
5062	45	104.0	1	0.070	175U1009
5072	55	144.6	1	0.051	175U0070
5102	75	174.1	1	0.042	175U0071



See also instruction MI.50.NX.YY for further information.

■ Ordering numbers, Harmonic filters

Harmonic filters are used to reduce mains harmonics
- AHF 010: 10% current distortion
- AHF 005: 5% current distortion

380-415 V, 50Hz

$I_{AHF,N}$	Typical Motor Used [kW]	Danfoss ordering number		VLT 5000
		AHF 005	AHF 010	
10 A	4, 5.5	175G6600	175G6622	5006, 5008
19 A	7.5	175G6601	175G6623	5011
26 A	11	175G6602	175G6624	5016
35 A	15, 18.5	175G6603	175G6625	5022, 5027
43 A	22	175G6604	175G6626	5032
72 A	30, 37	175G6605	175G6627	5042, 5052
101 A	45, 55	175G6606	175G6628	5062, 5072
144 A	75	175G6607	175G6629	5102
180 A	90	175G6608	175G6630	5122
217 A	110	175G6609	175G6631	5152
289 A	132, 160	175G6610	175G6632	5202, 5252
324 A		175G6611	175G6633	
370 A	200	175G6688	175G6691	5302
Higher ratings can be achieved by paralleling the filter units				
434 A	250	Two 217 A units		5352
578 A	315	Two 289 A units		5452
613 A	355	289 A and 324 A units		5502
648 A	400	Two 324 A units		5552

Please note that the matching of the typical Danfoss frequency converter and filter is pre-calculated based on 400 V and assuming typical motor load (4 or 2 pole motor): VLT 5000 series is based on a max. 160 % torque application. The pre-calculated filter current may be different than the input current ratings of VLT 5000 as stated in the respective operating instructions, as these numbers are based on different operating conditions.

440-480 V, 60Hz

$I_{AHF,N}$	Typical Motor Used [HP]	Danfoss ordering number		VLT 5000
		AHF 005	AHF 010	
19 A	10, 15	175G6612	175G6634	5011, 5016
26 A	20	175G6613	175G6635	5022
35 A	25, 30	175G6614	175G6636	5027, 5032
43 A	40	175G6615	175G6637	5042
72 A	50, 60	175G6616	175G6638	5052, 5062
101 A	75	175G6617	175G6639	5072
144 A	100, 125	175G6618	175G6640	5102, 5122
180 A	150	175G6619	175G6641	5152
217 A	200	175G6620	175G6642	5202
289 A	250	175G6621	175G6643	5252
324 A	300	175G6689	175G6692	5302
370 A	350	175G6690	175G6693	5352
Higher ratings can be achieved by paralleling the filter units				
506 A	450	217 A and 289 A units		5452
578 A	500	Two 289 A units		5502
648 A	600	Two 324 A units		5552

Please note that the matching of the typical Danfoss frequency converter and filter is pre-calculated based on 480 V and assuming typical motor load (4 or 2 pole motor): VLT 5000 series is based on a max. 160 % torque application. The pre-calculated filter current may be different than the input current ratings of VLT 5000 as stated in the respective operating instructions, as these numbers are based on different operating conditions.

500 V, 50 Hz

$I_{AHF,N}$	Typical Motor Used [kW]	Danfoss ordering number		
		AHF 005	AHF 010	VLT 5000
10 A	4, 5.5	175G6644	175G6656	5006, 5008
19 A	7.5, 11	175G6645	175G6657	5011, 5016
26 A	15, 18.5	175G6646	175G6658	5022, 5027
35 A	22	175G6647	175G6659	5032
43 A	30	175G6648	175G6660	5042
72 A	37, 45	175G6649	175G6661	5052, 5062
101 A	55, 75	175G6650	175G6662	5062, 5072
144 A	90, 110	175G6651	175G6663	5102, 5122
180 A	132	175G6652	175G6664	5152
217 A	160	175G6653	175G6665	5202
289 A	200	175G6654	175G6666	5252
324 A	250	175G6655	175G6667	5302
Higher ratings can be achieved by paralleling the filter units				
434 A	315	Two 217 A units		5352
469 A	355	180 A and 289 A units		5452
578 A	400	Two 289 A units		5502
648 A	500	Two 324 A units		5552

Please note that the matching of the typical Danfoss frequency converter and filter is pre-calculated based on 500 V and assuming typical motor load. VLT 5000 series is based on a 160 % torque application. The pre-calculated filter current may be varying from the input current ratings of VLT 5000 as stated in the respective operating instructions, as these numbers are based on different operating conditions. For further combinations, please consult MG.80.BX.YY.

690 V, 50 Hz

I AHF,N	Typical motor used (kW)	Ordering no. AHF 005	Ordering no. AHF 010	VLT 5000 160%	VLT 5000 110%
43	37, 45	130B2328	130B2293	5042, 5042	5042
72	55, 75	130B2330	130B2295	5062, 5072	5052, 5062
101	90	130B2331	130B2296	5102	5072
144	110, 132	130B2333	130B2298	5122, 5152	5102, 5122
180	160	130B2334	130B2299	5202	5152
217	200	130B2335	130B2300	5252	5202
289	250	130B2331 & 130B2333	130B2301	5302	5252
324	315	130B2333 & 130B2334	130B2302	5352	5302
370	400	130B2334 & 130B2335	130B2304		5352

■ Index