VLT® AutomationDrive

THE REAL DRIVE

The modular VLT® AutomationDrive

VLT® AutomationDrive allows for mass production and factory testing of highly customised drives. Upgrades and options are plug-and-play easy.

Enclosure

The drive meets requirements for enclosure class IP 20/Chassis. Optional IP21/NEMA 1 or IP55/NEMA 12.

Cold plate technology

The drive is built on a rock-solid aluminium base that's integrated with the back panel. This provides high mechanical stability, efficient cooling and the option of cold plate operation.

DC coil

The renowned DC coil ensures very low harmonic disturbance of the power supply, in accordance with IEC-1000-3-2. Compact design means no need for external modules.

Conformal coating

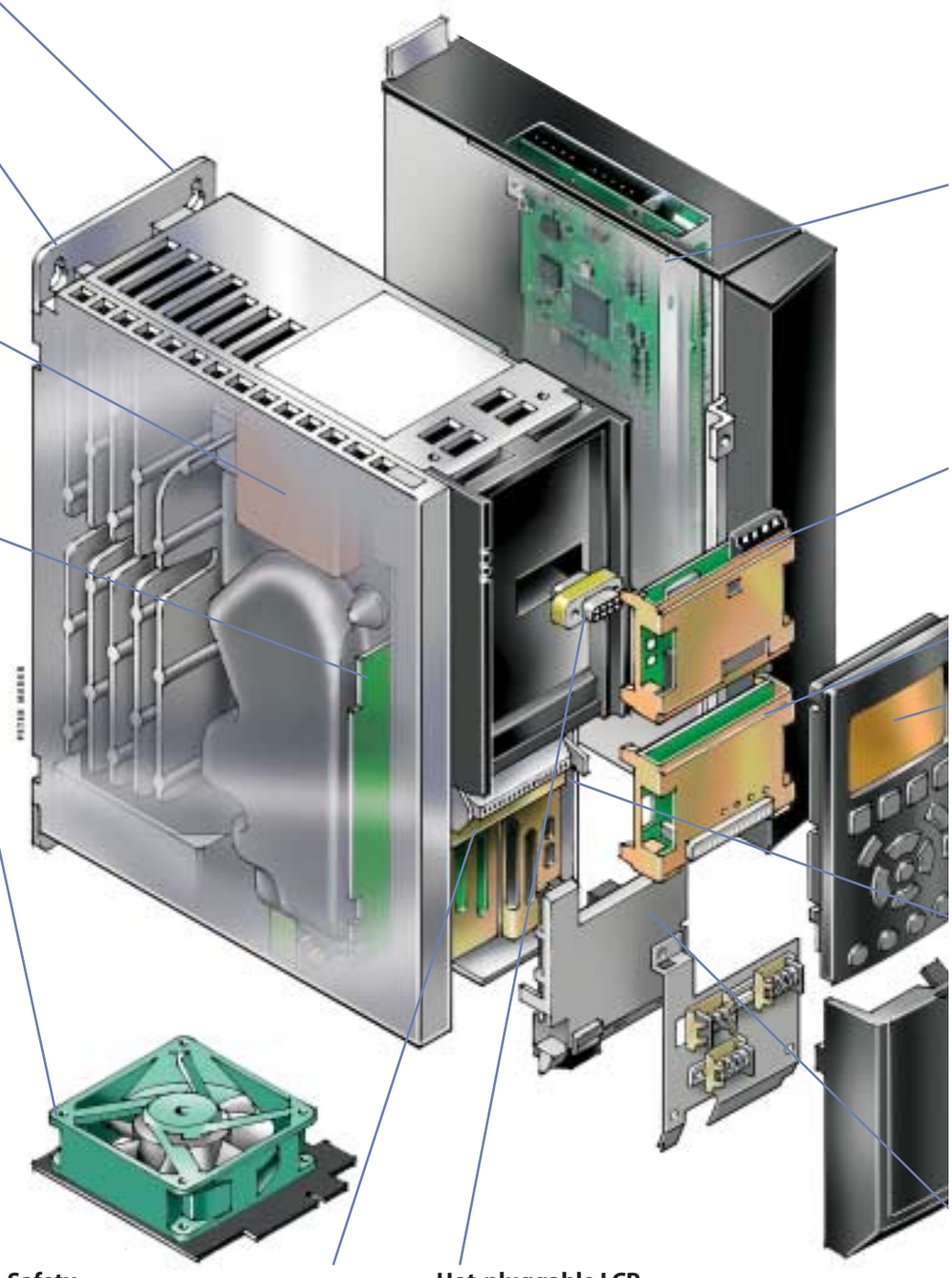
Available with a coated circuit board that makes the drive perfect for operation in harsh environments.

Removable fan

Like most of the elements, the fan can be quickly removed and remounted for easy cleaning.

RFI

RFI available with A1/B1 and A2, for compliance with IEC 61000 and EN 61800 standards.

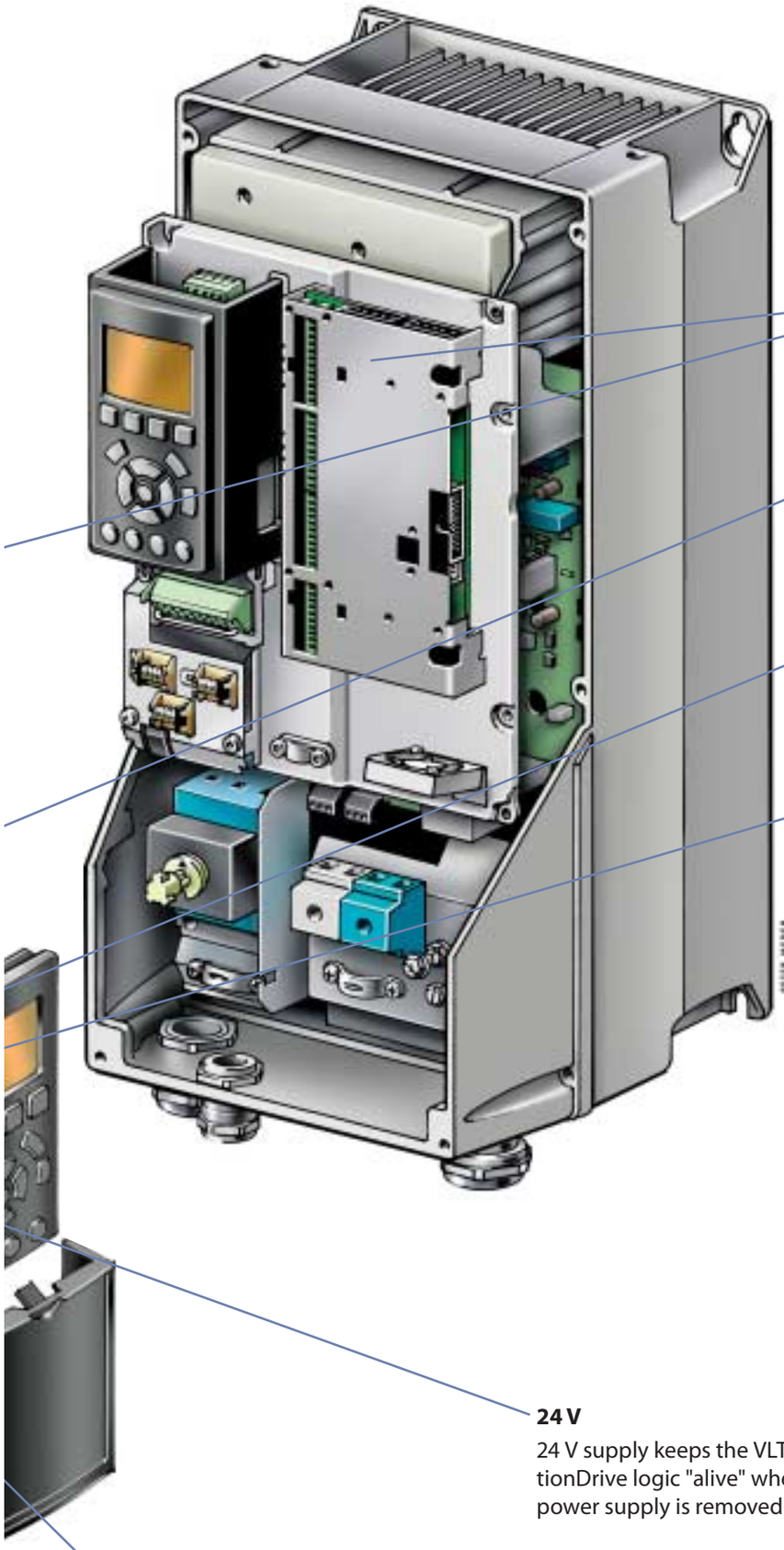


Safety

The VLT® AutomationDrive FC 302 comes standard with the safe stop functionality suitable for category 3 installations in accordance with EN 954-1. This feature prevents the drive from starting unintendedly. Profisafe optional.

Hot-pluggable LCP

The local control panel (LCP) can be plugged in or unplugged during operation. Settings are easily transferred via the control panel from one drive to another or from a PC with MCT-10 set-up software.



Advanced option

Free programmable option MCO 305 option for synchronisation, positioning, cam control and more.

Fieldbus option

Options for bus communication (Profibus, Devicenet, CanOpen etc.), synchronisation, user programs, etc., are delivered ready to go.

Application option

General purpose I/O
CI Encoder
Resolver
Relay options
Safe interface

Display options

Danfoss Drives removable Local Control Panel now comes with an improved user-interface. Choose between six built-in languages (including Chinese) or have it customised with any language you like. Two of the languages can be changed by the user. The info button makes the printed manual virtually redundant. Users have been involved throughout development to ensure great functionality and performance. The user group has significantly influenced design and function of the Local Control Panel. The Automatic Motor Adaptation, Quick Set-Up menu and large graphic display make commissioning and operation a breeze. Your choice of numerical display, graphical display or blind cover.

24 V

24 V supply keeps the VLT® AutomationDrive logic "alive" when the AC power supply is removed.

Control terminals

Specially developed spring-loaded cage clamps enhance reliability and facilitate easy commissioning and service.

Press, place, release – and you have a reliable control cable connection that never needs servicing.

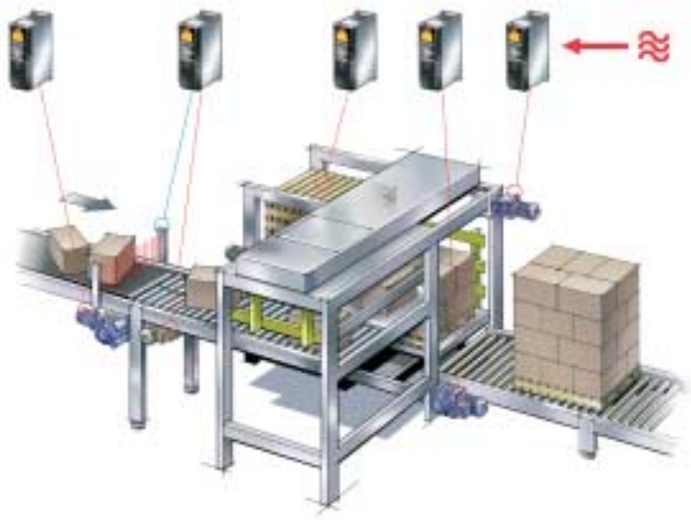
VLT® AutomationDrive supports all PROFIdrive profiles for automation.

The fan is easily removed for cleaning of the heatsink.

Just one drive

to run a complete production line

The VLT® AutomationDrive FC 300 is a single drive concept that controls all operations from standard to servo motors on any machine or production line. The standard versions cover a wide range of functions such as PLC functionality, automatic fine-tuning of motor control and self-analysis of performance. Positioning, synchronizing, load estimation and even servo performance are available too. All versions share an identical user interface, so once you've operated one you can use them all.



Add flexibility to precision

The new VLT® AutomationDrive lets you alter production speed without rebuilding the conveyor. The Precise Pulse Stop feature ensures that products always are where they should be on the line.

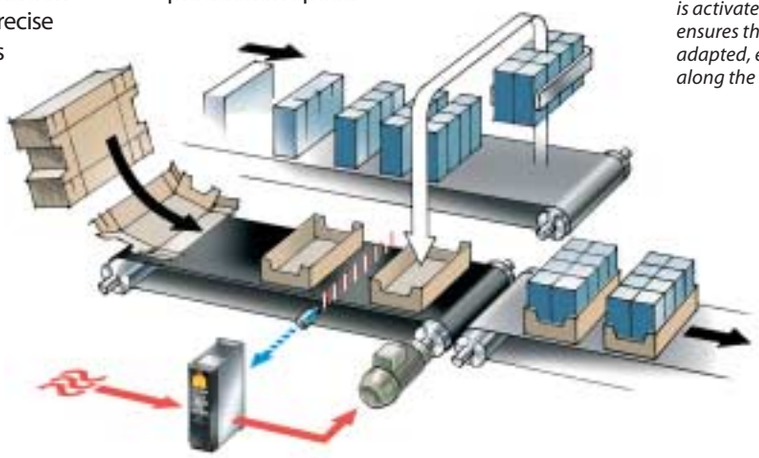
Speed or slow the entire line

Production speed can be changed at any time. Even if the application involves several parts. The Precise Pulse Reference feature makes the conveyors follow the encoder from master conveyor, ensuring that all conveyors are in sync.

Benefits:

- The conveyor can be stopped at a precise location using an open loop system independent of production speed.
- Precise Pulse Stop compensates for the speed of the object when it passes the stop sensor. This results in a precise stop, regardless of production speed.

The bottle is beneath the inspection camera at the exact moment the flash is activated. The AutomationDrive ensures that production speed is adapted, even in complex operations along the entire production line.



To disconnect wires, simply unplug the terminal blocks.

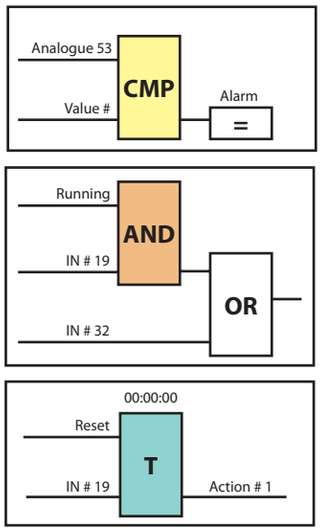
Plug-and-play is the way with the VLT® AutomationDrive. Even the power supply, sensor cables and looping connections are convenient plugs.

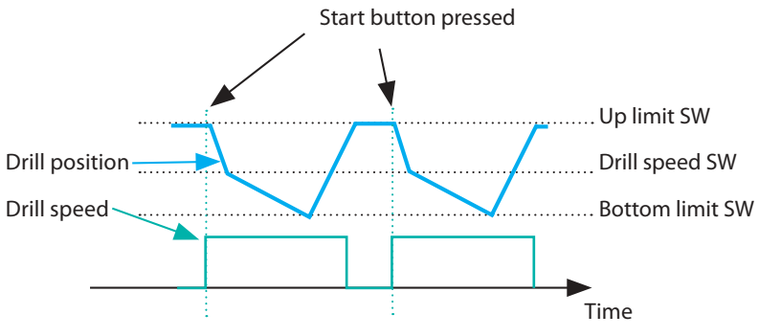
The fieldbus option ready to plug in beneath the front panel. It can be turned upside down if you'd rather have the cable on top.

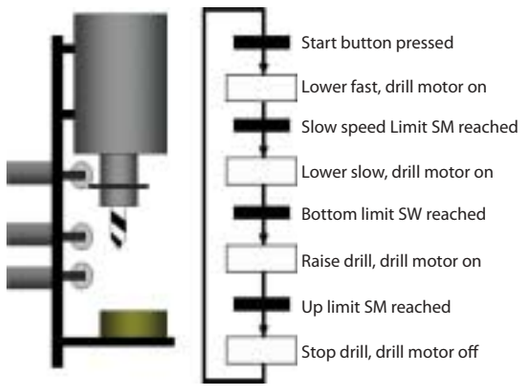
Built-in Smart Logic Controller

The smart logic controller is a simple but clever way to keep your drive, motor and application working together. The controller monitors a specified event. When the event occurs, the controller triggers a specified act and starts monitoring the next event continuing for up to 20 different steps before returning to step one.
The smart logic controller is able to monitor any parameter that can be defined as "true" or "false".

This includes digital commands but also logic expressions, allowing even sensor outputs to influence the operation. Temperature, pressure, flow, time, load, frequency, voltage and other parameters combined with the operators ">", "<", "=", "and" and "or" forms logical statements.
That's why Danfoss calls it a "logic" controller. And it's why, you can program the controller to react to almost any event you choose.

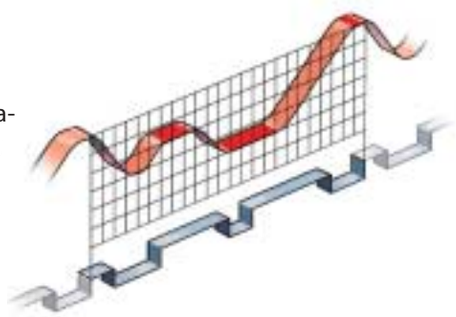






VLT® MCO 305 Motion Controller

The MCO 305 is an integrated programmable Motion Controller. It adds even more functionality and flexibility to these drives. With the MCO 305, the VLT® AutomationDrive becomes an intelligent drive featuring highly accurate, dynamic motion control, synchronisation (electronic shaft), positioning and electronic Cam control. And programmability lets you implement a variety of application functions, such as monitoring and intelligent error handling.



Three panel options: graphical, numerical, blind cover.

The VLT® AutomationDrive is controlled locally via a control panel. This is plugged in directly or connected via a cable.

The VLT® AutomationDrive can be remote commissioned and monitored via a USB cable or bus communication. Special software is available: Wizards, Data transfer tool, VLT® Set-up Software, MCT 10 and Language changer.

Award-winning control panel

Graphical display

- International letters and symbols
- Shows bars and graphs
- Easy overview
- Select from 27 languages

Other benefits

- Removable during operation
- Upload and download
- IP65 rating when mounted in panel door
- Numerical version also available

Illumination

- Selected LEDs are illuminated when active

Menu structure

- Based on the matrix system, well known from previous VLT® drives
- Easy shortcut for experienced users
- Edit and operate in different set-ups simultaneously

Quick Menus

- Danfoss defined Quick Menu
- Personalised Quick Menu
- Changes Made Menu lists parameters unique to your application
- Application Set-Up Menu provides quick set-up for specific applications

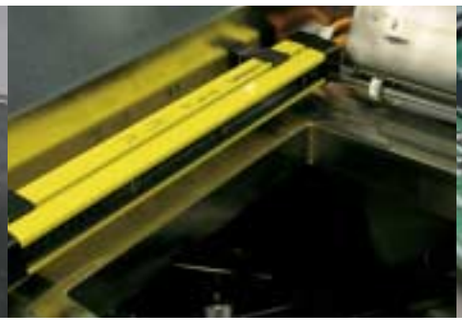
New buttons

- Info ("on board manual")
- Cancel ("undo")
- Alarm log (quick access)

design award winner
2004

The VLT® AutomationDrive local control panel (LCP) won the international iF design award in 2004. The panel beat out 1000 entries from 34 countries in the "interface in communication" category.

DC coils reduce harmonic noise and protects the drive.



Safety installations can be connected directly to the VLT® AutomationDrive.

Coated control boards are avilable for harsh environments.

Intelligent heat management

Cooling can take place in two ways for different benefits

Total separation between cooling air and electronics allows for solutions where heat is removed outside cabinets.

With VLT® AutomationDrive, a flanged heatsink kit is available for mounting the drive in the backplate of a cabinet.

Forced convection cooling

A fan blows cold air through the cooling ribs of the aluminium base. The channel is easily cleaned without touching electronics.

Cold plate cooling

External cooling is possible through the back side of the aluminum base.

Wall mounted with forced cooling through the heatsink.

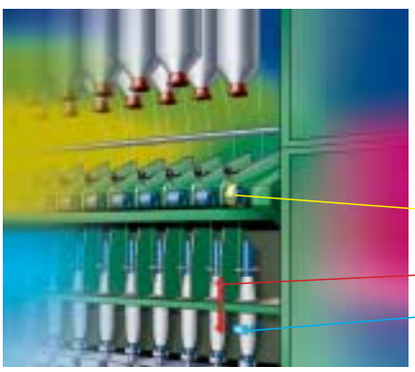
Flanged heatsink

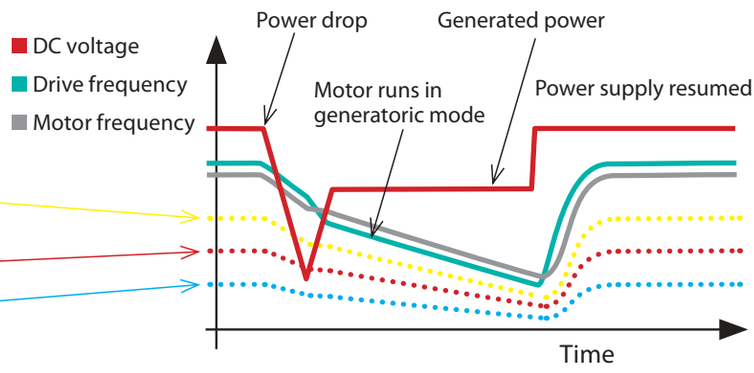
A smart, dedicated kit allows D1 and D2 enclosures to be mounted in Rittal cabinets so cool air removes 85% of excess heat without contact to the electronics.

Kinetic backup

The VLT® AutomationDrive can utilize power generated from the kinetic energy for controlled ramp-down in case of power loss.

The application is ready for quick restart when the power returns.





Reliable, accurate load handling

Changing conditions influence the operation cranes and other equipment. Depending on position and load, a crane tends to shake when stopping or starting, because it's calibrated to an average load.
The VLT® AutomationDrive estimates motor currents generated by actual loads and compensates to make the crane start and stop smoothly just where it should. The same benefits apply to hoists and elevators.

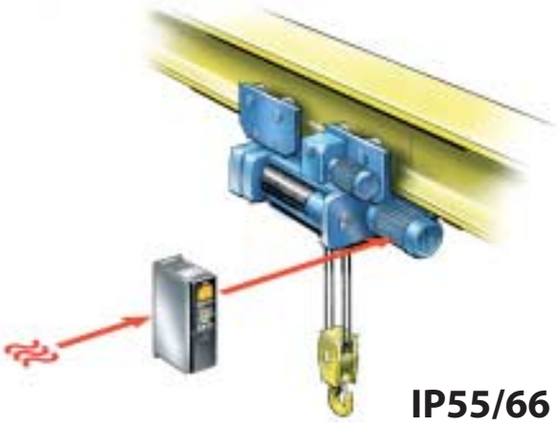
Small loads handled quicker
Equipment has to be dimensioned to handle a maximum load, and speed is usually determined by this maximum load.

The ability to change speed automatically allows equipment to operate at a partial or minimum load. The drive estimates the load and maximises production speed.

Gentle on goods – and brakes
When stopped, the VLT® AutomationDrive will slow the hoist to zero before activating the mechanical brake. This results in gentler handling and virtually eliminates wear on the brakes.

Benefits:

- Low torque ripple gives smooth operation.
- Precise load estimation allows for precise positioning regardless of load.
- Load estimation saves time and speeds up production – safely and intelligently.
- Full holding torque capability at 0 RPM gives a smooth ride and reduces mechanical wear on gears and brakes – less maintenance and more production uptime.



IP55/66 for harsh environments

All VLT® AutomationDrive versions have manganic phosphor rear bodies. The back of IP 66 is dip-coated with epoxy or polyester spray finish (60-100 µm). The cover is powder coated (80-100 µm).
The silicone gasket is tested with different detergents.

Smal footprint

VLT® AutomationDrive has a compact design. All power sizes are smaller than their predecessors. No dimension has increased and volumes are typically 20% smaller.

Conversion kit

A conversion kit is available to facilitate exchange from earlier VLT® drives.
The backplate has pre-drilled holes. Cabelling from VLT® 3000 and VLT® 5000 can be reused with the terminal adapter.

Accessories

Dynamic braking
The VLT® AutomationDrive can be ordered with a built-in dynamic brake option utilizing the latest IGBT technology to provide fast deceleration of the connected motor. The dynamic brake option is built into the FC 300 at time of purchase and cannot be retrofitted in the field.

Brake resistor(s) must be used in conjunction with the dynamic brake to dissipate the heat/power regenerated by the motor during deceleration or overhauling load. Select the appropriate resistor for your application from the following charts. Brake resistors must be ordered separately and field installed by the customer.

LCP Panel mounting kit
The kit lets you mount the LCP in a IP 65 cabinet front.

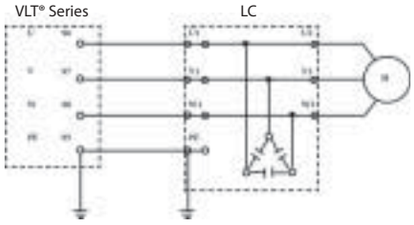
Disconnect switch available
Mounting the optional disconnect swich on the front of B, C, D or E enclosures eliminates the need for an external swich-box.

Advanced harmonic filters
VLT® Harmonic Filter AHF 010/005. AHF 010 reduces the harmonic current to less than 10%, while the AHF 005 lowers this current to less than 5%.
The Danfoss AHF 005 and AHF 010 are advanced harmonic filters and should not be compared with traditional harmonic trap filters. They have been specially designed to match the Danfoss frequency drives.

Sinewave filters
When the speed of a motor is controlled by a drive, resonance noise from the motor can occur. This is due to the construction of the motor and the switching of IGBTs. The frequency of the resonance will correspond to the switching frequency of the drive.

In applications where this noise is undesirable, Danfoss offers Sinewave filters for the FC 300 to dampen the acoustics.

These filters are installed electrically between the FC 300 and the motor to reduce voltage rise time (dv/dt), peak voltage (Vmax) and the ripple current to the motor, thus reducing the noise generated.
Refer to the following table to find the appropriate Sinewave filter. Sinewave filters must be ordered separately and field installed by the customer.



Profibus adaptor Sub-D9 connector
The adaptor makes linking of fieldbus connections pluggable.

One drive – two performance levels

Special needs require special features and performance.

	FC 301 A1	FC 301	FC 302
Power range 200 - 240 V [kW]	0.25 - 1.5	0.25 - 45	0.37 - 45
Power range 380 - (480) 500 V [kW]	0.37 - 1.5	0.37 - 45	0.37 - 1.1 M
Power range 550 - 600 V [kW]	-	-	0.75 - 7.5
Power range 525 - 690 V [kW]	-	-	11 - 1.2 M
Amb. temp °C Avg.24 hours (IP21) w/o de-rating	45	45	45
Ambient temp °C max (IP21) w/o de-rating	50	50	50
Ambient temp °C max with de-rating	55	55	55
IP21/NEMA type1/IP55/NEMA type12	√	√	√
IP66/NEMA type 4x	-	-	√
Smart Logic Control	√	√	√
Logic Rule Control	√	√	√
Safe Stop input function approved	√	-	√
Local Control Panel numerical or graphical	√	√	√
Info/Help function	√	√	√
Personal menu (macro)	√	√	√
Regional settings (US mode)	√	√	√
Language settings	√	√	√
Change made restore previous setting	√	√	√
Password protection	√	√	√
Analogue input	0 to +10 V	0 to +10 V	-10 to +10 V
Digital inputs	5	5	6
Digital transistor outputs [1)]	1	1	2
Relay outputs	1	1	2
Analogue output resolution	12 bit	12 bit	12 bit
PC connection: RS 485 and USB	√	√	√
Default motor data	√	√	√
Permanent Magnet Motor algorithm	-	-	√
Process PID control	√	√	√
Precise Start/Stop	√	√	√
Preset references	8	8	8
Digipotmeter	√	√	√
Ramp functions: linear and S-ramps	√	√	√
Profibus, DeviceNet, CANOpen	√	√	√
ProfiSafe	-	-	√
Interface options:			
Extended input/outputs MCB 101	√	√	√
Encoders option MCB 102	√	√	√
Resolver option MCB 103	√	√	√
Relay option MCB 105	√	√	√
Safe PLC interface MCB 108	√	-	√
Motion Control Options: MCO 305	-	√	√
External 24 V back-up option MCB 107	-	√	√
Cable length – screened/unscreened	25/50 m	50/75 m	150/300 m
RFI EN55011 cl A2 (Industry)	<5 m	<5 m	<5 m
RFI EN55011 cl A1 (Industry)	<25 m	<50 m	<150 m
RFI EN55011 cl B (Domestic)	2.5 m	<10 m	<50 m
Voltage Vector Control VVC+	√	√	√
Flux Vector Control	-	-	√
Automatic Energy Optimizing (AOE)	-	-	√
Controlled ramp down	-	-	√
Flying start – catch spinning motor			√
Variable switching frequency 1 – 16 kHz[2)]	√	√	√
Over Voltage Control	√	√	√
Fan replaceable	√	√	√

1) Converting digital inputs
2) Power-size dependent
** Smallest cabinet size*

VLT® AutomationDrive FC 302 offers a wide range of advanced features

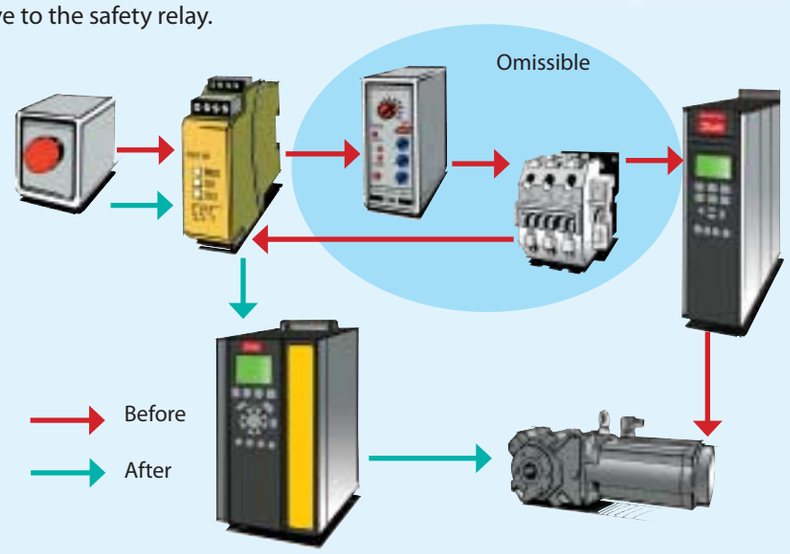
One wire safety

The VLT® AutomationDrive FC 302 comes standard with safe stop functionality suitable for category 3 installations as defined by EN 954-1. This feature prevents a drive from starting accidentally.
This is crucial for applications where preventing unintended starts are of vital importance. The FC 302 terminal 37 can be used as "safe coast" for this purpose – the stop function satisfies stop category 3 EN 60204-1.

Expensive and bulky external components can be omitted, wiring simplified, and down-time minimised with this solution. And the safety signals can be transferred via discrete signals wiring (in compact machinery) or safe bus communication (in extended manufacturing plants).

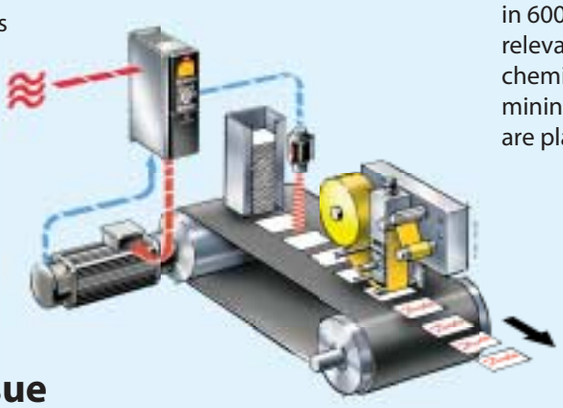
The coupling of Pilz safety relay and AutomationDrive is perfect, because AutomationDrive is approved for safety category 3 applications.

The electrical connection is extremely simple – just one wire. Automation-Drive is approved for providing safe stop in category 3 installations without the need for feedback signals from the drive to the safety relay.



VLT® AutomationDrive FC 302 runs permanent magnet motors

VLT® AutomationDrive FC 302 exploits full potential of permanent magnet motors in high dynamic applications. Fast processors enable it to precisely control position, acceleration and torque.



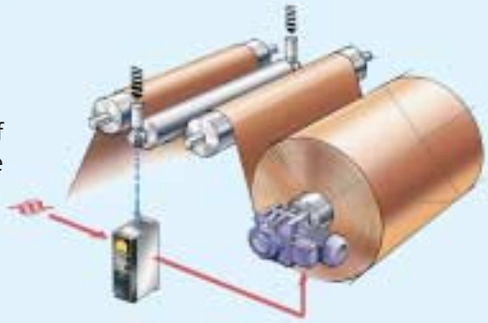
600 & 690 V

VLT® AutomationDrive FC302 comes in 600 and 690 V series specially relevant for heavy industries like chemistry, water and gas supply, mining, and forestry. 690 V versions are planned up to 1.2 MW.

When torque is the issue

In all winders the torque required to accelerate and decelerate an application varies with the load. With centre winders the required torque even varies with the dimension of the roll. Torque mode with a high-precision torque control is needed.

It'is essential in winding operations to fully control the tension of the material being wound. To maintain tangential tension independently of the line speed and roll diameter, the drive is able to dynamically follow a wide range of torque references.



Typical current and power ratings

	230 V				400 V				460 V				575 V				690 V			
	Normal OL 110 % torque		High OL 160 % torque		Normal OL 110 % torque		High OL 160 % torque		Normal OL 110 % torque		High OL 160 % torque		Normal OL 110 % torque		High OL 160 % torque		Normal OL 110 % torque		High OL 160 % torque	
	IN Amps	PN kW	IH Amps	PN kW	IN Amps	PN kW	IH Amps	PN kW	IN Amps	PH HP	IH Amps	PH HP	IN Amps	PN HP	IH Amps	PH HP	IN Amps	PN kW	IN Amps	PH kW
PK25			1,8	0,25																
PK37			2,4	0,37			1,3	0,37			1,1	0,5								
PK55			3,5	0,55			1,8	0,55			1,6	0,75								
PK75			4,6	0,75			2,4	0,75			2,1	1,0			1,7	1,0				
P1K1			6,6	1,10			3	1,10			3	1,5			2,4	1,5				
P1K5			7,5	1,5			4,1	1,5			3,4	2,0			2,7	2,0				
P2K2			10,6	2,2			5,6	2,2			4,8	3,0			4,1	3,0				
P3K0			12,5	3			7,2	3			6,3	4,0			5,2	4,0				
P3K7			16,7	3,7																
P4K0							10	4			8,2	5,5			6,4	5,5				
P5K5	30,8	7,5	24,2	5,5			13	5,5			11	7,5			9,5	7,5				
P7K5	46,2	11	30,8	7,5			16	7,5			14,5	10			11,5	10				
P11K	59,4	15	46,2	11	32	15	24	11	27	20	21	15	18	15			18	15	13	11
P15K	74,8	18,5	59,4	15	37,5	18,5	32	15	34	25	27	20	22	20	18	15	22	18.5	18	15
P18K	88	22	74,8	18,5	44	22	37,5	18,5	40	30	34	25	27	25	22	20	27	22	22	18.5
P22K	115	30	88	22	61	30	44	22	52	40	40	30	34	30	27	25	34	30	27	22
P30K	143	37	115	30	73	37	61	30	65	50	52	40	41	40	34	30	41	37	34	30
P37K	170	45	143	37	90	45	73	37	77	60	65	50	52	50	41	40	52	45	41	37
P45K					106	55	90	45	96	75	80	60	62	60	52	50	62	55	52	45
P55K					147	75	106	55	130	100	105	75	83	75	62	60	83	75	62	55
P75K					177	90	147	75	160	125	130	100	100	100	83	75	100	90	83	75
P90K					212	110	177	90	190	150	160	125	125	125	100	100	125	110	100	90
P110					260	132	212	110	240	200	190	150	155	150	131	125	155	132	131	110
P132					315	160	260	132	302	250	240	200	192	200	155	150	192	160	155	132
P160					395	200	315	160	361	300	303	250	242	250	192	200	242	200	195	160
P200					480	250	395	200	443	350	361	300	290	300	242	250	290	250	242	200
P250					600	315	480	250	540	450	443	350	344	350	290	300	344	315	290	250
P315					658	355	600	315	590	500	540	450	400	400	344	350	400	400	344	315
P355					745	400	658	355	678	550	590	500								
P400					800	450	695	400	730	600	678	550	523	500	429	400	500	500	410	400
P450					880	500	800	450	780	650	730	600								
P500					990	560	880	500	890	700	780	650	596	600	523	500	570	560	500	500
P560					1120	630	990	560	1050	800	890	700	630	650	596	600	630	630	570	560
P630					1260	710	1120	630	1160	900	1050	800	730	750	630	650	730	710	630	630
P710					1460	900	1260	710	1380	1100	1160	900	890	900	730	750	890	800	730	710
P800					1700	1000	1460	800	1530	1250	1380	1100	1060	1100	898	900	1060	1000	896	800
P1M0													1260	1300	1060	1100	1260	1200	1060	1000

For 441- 500 and 525 - 600 Volt versions the power is stated in Horse Power (North American market)

Cabinet sizes

[mm]

IP20 and IP21/NEMA1

Enclosure name		A1*	A2	A3	B1	B2	C1	C2	D1	D2	E1	E2	E3
Height	IP20	200	268	268	481	651	680	770	1159	1540	2000	2000	2000
	IP21 / NEMA1	307	370	370									
Width	without Option C	75	90	130	242	242	308	370	420	420	600	1400	1600
	with slim Option C		130	170									
	with wide Option C		1550	190									
Depth	without Option A or B	205	205	205	261	261	310	335	373	373	494	600	600
	with Option A or B	219	219	219									

** Only FC 301*

IP54/IP55/IP66/NEMA12

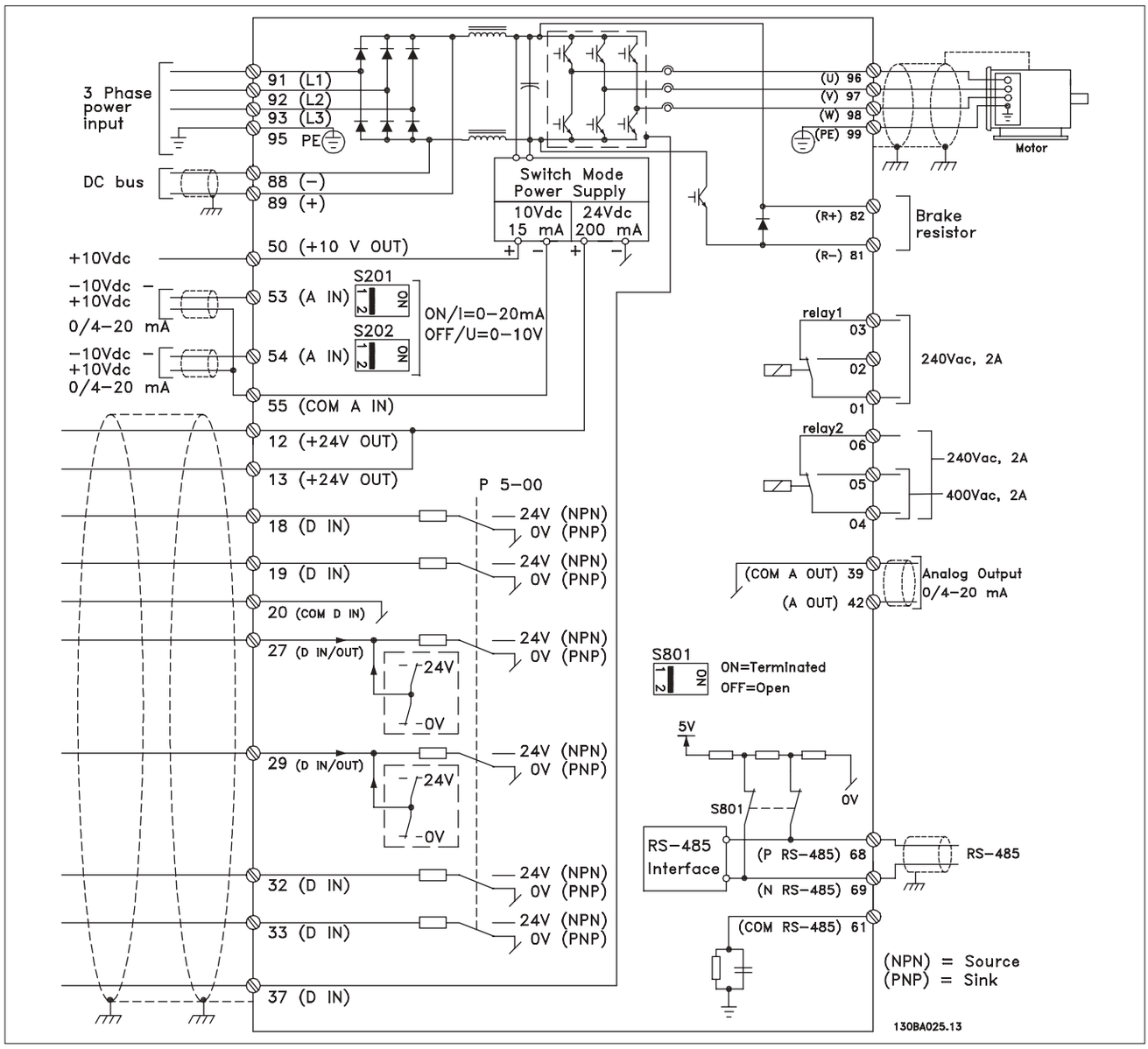
Enclosure name		A5	B1	B2	C1	C2	D1	D2	E1	E2	E3
Height		420	481	651	680	770	1159	1540	2000	2000	2000
Width		242	242	242	308	370	420	420	600	1400	1600
Depth		200	261	261	310	335	373	373	494	600	600

IP00/Chassis

Enclosure name		D1	D2	E1
Height		997	1277	1499
	without Option C, with slim Option C and with wide Option C	408	408	585
Depth	without Option A or B	373	373	494
	with Option A or B			

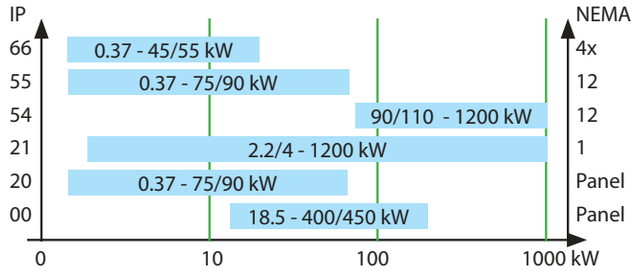
Connection examples

This diagram shows a typical installation of the AutomationDrive FC 300. The numbers represent the terminals on the drive.



1)Additional safe stop input on FC 302 and FC 301 A1 (Terminal 37)

Broad range of protection classes



Specifications

Mains supply (L1, L2, L3):

Supply voltage	FC 301 and FC 302: 200-240 V ±10%
Supply voltage	FC 301: 380-480 V / FC 302: 380-500 V ±10%
Supply voltage	FC 302: 550-600 V ±10%
Supply voltage	FC 302: 525-690 V ± 10%
Supply frequency	50/60 Hz
Displacement Power Factor (cos ϕ) near unity	(> 0.98)
Switching on input supply L1, L2, L3	2 times/min.

Output data (U, V, W):

Output voltage	0-100% of supply voltage
Output frequency	FC 301: 0.2-1000 Hz / FC 302: 0-1000 Hz
Switching on output	Unlimited
Ramp times	0.02-3600 sec.
Closed loop	0-132 Hz

Digital inputs:

Programmable digital inputs	FC 301: 4(5) > 5 / FC 302: 4(6) > 6
Logic	PNP or NPN
Voltage level	0 - 24 V DC
Voltage level, logic	'0' PNP logic < 5 V DC
Voltage level, logic	'1' PNP logic > 10 V DC
Voltage level, logic	'0' NPN logic > 19 V DC
Voltage level, logic	'1' NPN logic < 14 V DC
Maximum voltage on input	28 V DC
Input resistance, Ri	approx. 4 k Ω

Analog inputs:

Analog inputs	2
Modes	Voltage or current
Voltage level	FC 301: 0 to +10 V
	FC 302: -10 to +10 V (scaleable)
Current level	0/4 to 20 mA (scaleable)
Accuracy of analog inputs	Max. err. 0.5% of full scale
Scan interval	FC 301: 10 ms / FC 302: 1 ms

Pulse/encoder inputs:

Programmable pulse/encoder inputs	2/1
Voltage level	0 - 24 V DC (PNP positive logic)
Pulse input accuracy (0.1 - 110 kHz)	Max. error: 0.1% of full scale
Encoder input accuracy (1– 110 kHz)	
	Max. error: 0.05% of full scale 32 (A), 33 (B) and 18 (Z)

Digital output:

Programmable digital/pulse outputs	FC 301: 1 / FC 302: 2
Voltage level at digital/frequency output	0 - 24 V DC
Max. output current (sink or source)	40 mA
Maximum output frequency at frequency output	32 kHz
Accuracy on frequency output	Max. error: 0.1% of full scale

Analog output:

Programmable analog outputs	1
Current range at analog output	0/4 - 20 mA
Max. load to common at analog output	500 Ω
Accuracy on analog output	Max. error: 1% of full scale

Onboard Power Supply:

Output voltage	10.5 V ±0.5 V
Max. load (10 V)	15 mA
Max. load (24 V)	FC 301: 130 mA / FC 302: 200 mA

Relay outputs:

Programmable relay outputs	FC 301: 1 / FC 302: 2
Max. terminal load (AC) on 1-3 (break), 1-2 (make), 4-6 (break) power card	240 V AC, 2 A
Max. terminal load (AC) on 4-5 (make) power card	400 V AC, 2 A
Min. terminal load on 1-3 (break), 1-2 (make), 4-6 (break), 4-5 (make) power card	24 V DC 10 mA, 24 V AC 100 mA

Cable lengths:

Max. motor cable length, screened (shielded)	FC 301: 50 m
	FC 302: 150 m
Max. motor cable length, unscreened (unshielded)	FC 301: 75 m
	FC 302: 300 m

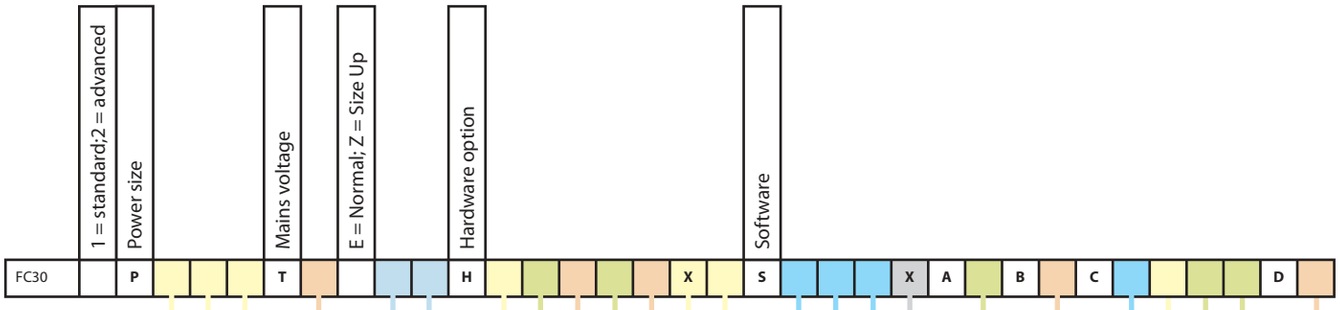
Surroundings/ External:

Enclosure	IP 20/IP 21/IP 55
Vibration test	0.7 g
Max. relative humidity	5% - 95% (IEC 721-3-3; Class 3K3 (non-condensing) during operation
Aggressive environment (IEC 721-3-3), uncoated class 3C2	
Aggressive environment (IEC 721-3-3), coated class 3C3	
Ambient temperature	Max. 50 °C
24-hour average	Max. 45 °C

Protection mode for longest possible up-time:

- Electronic thermal motor protection against overload
- Temperature monitoring of the heatsink ensures that the FC 300 cuts out if the temperature reaches 100 °C
- The FC 300 is protected against short-circuits on motor terminals U, V, W
- Protection against mains phase loss
- The FC 300 is protected against earth fault on motor terminals U, V, W

Configure freely



Power size [kW]	
0,25	K 2 5
0,37	K 3 7
0,55	K 5 5
0,75	K 7 5
1,10	1 K 1
1,5	1 K 5
2,2	2 K 2
3	3 K 0
3,7	3 K 7
4	4 K 0
5,5	5 K 5
7,5	7 K 5
11	1 1 K
15	1 5 K
18,5	1 8 K
22	2 2 K
30	3 0 K
37	3 7 K
45	4 5 K
55	5 5 K
75	7 5 K
90	9 0 K
110	1 1 0
132	1 3 2
160	1 6 0
200	2 0 0
250	2 5 0
315	3 1 5
355	3 5 5
400	4 0 0
450	4 5 0
500	5 0 0
560	5 6 0
630	6 3 0
710	7 1 0
800	8 0 0
1000	1 M 0

RFI filter	
No filter	X
A1/B	1

Brake	
No filter	X
A1/B	1

Local Control panel	
No LCP	X
Numerical LCP	N
Graphical LCP	G

Coating	
PCB not coated	X
PCB coated	C

Mains Options	
No options	X
Mains disconnect	1
Load sharing	D
Fuses	7

Mains Voltage [V]	
2	200 - 240
4	380 - 480
5	380 - 500
6	525 - 600
7	525 - 690

Reserved

Software	
Latest standard sw	X X X
Dedicated software 1	0 0 1
Dedicated software 2	0 0 2

Enclosure		
2	0	IP20/Chassis
2	1	IP21/Nema Type 1
5	5	IP55/Nema Type 12
6	6	IP66
5	4	IP54/Nema Type 12
0	0	IP00/Chassis

Reserved

A-options	
No option	X
Profibus	0
DeviceNet	4
CanOpen	6

B-options	
No options	X
General purpose I/O	K
CI Encoder	R
Resolver	U
Relay options	P
Safe interface	Z

C-options	
No options	X
MCO 305	1
Profitsafe	A

No selection	X
Relay option	0

No software option	X	X
Software option 1	1	X
Software option 2	2	X

D-options	
No options	X
24 V DC backup	0

These are the thousands of ways to configure a VLT® AutomationDrive.
By choosing between options, you define your unique drive number.

Your drive is factory built from this number. You can configure online at www.danfoss.com/drives – choose "Online Configurator".

What VLT® is all about

Danfoss Drives is the world leader in providing drives – and is still gaining market shares.

The main factory in Graasten, Denmark

Dedicated to drives
Dedication has been a key word since 1968, when Danfoss introduced the world's first mass-produced variable-speed drive for AC motors – and named it VLT®.
Two thousand employees develop, manufacture, sell and service drives and softstarters in more than a hundred countries.

Intelligent and innovative
Danfoss Drives has fully adopted modular principles in development, design, production and configuration. Bold new technologies are developed in parallel using dedicated technology platforms. This reduces time to market and ensures that customers always reap the benefits of the latest technical advances.

Depend on the experts
We take responsibility for every element in our products. The fact that we develop and produce our own features, hardware, software, power modules, printed circuit boards, and accessories is your guarantee for unsurpassed reliability.

Local backup – globally
VLT® motor controls are operating in applications all over the world.
Our specialists in more than 100 countries are ready to support you with application advice and service anywhere you need it.

Danfoss Drives experts never stop until the customer's drive problems are solved.

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