FCD 300



Datasheet



Drives Solutions

www.danfoss.com/drives

■ Order form

This section makes it easier for you to specify and order an FCD 300.

Choice of frequency converter

The frequency converter must be chosen on the basis of the present motor current at maximum loading of the unit. The frequency converter's rated output current $I_{INV.}$ must be equal to or greater than the required motor current.

Mains voltage

FCD 300 is available for connection to mains voltage range: 380-480 V.

Typical shaft output $P_{INV.}$			Max. constant output current $I_{INV.}$	Max. constant output power at 400 V $S_{INV.}$
Type	[kW]	[HP]	[A]	[kVA]
303	0.37	0.50	1.4	1.0
305	0.55	0.75	1.8	1.2
307	0.75	1.0	2.2	1.5
311	1.1	1.5	3.0	2.0
315	1.5	2.0	3.7	2.6
322	2.2	3.0	5.2	3.6
330	3.0	4.0	7.0	4.8
335**	3.3	5.0*	7.6	5.3

* at mains/motor voltage 3 x 460 - 480 V

** t_{amb} max. 35° C

■ Enclosure

Stand alone mounting FCD 300 units are supplied protected against water and dust as standard. See also the section entitled *General technical data* for further details.

■ Brake

FCD 300 is available with or without an integral brake module. See also the section entitled *Brake resistors* for ordering a brake resistor.
Including mechanical brake control/supply.

■ 24 V external supply

Back up of control supply with 24 V DC is available as optional function.

■ RFI filter

FCD 300 has an integral 1A RFI-filter. The integral 1A RFI filter complies with EMC standards EN 55011-1A. See the sections *Cable lengths* and *Cross section* for further details.

■ Harmonic filter

The harmonic currents do not affect power consumption directly, but they increase the heat losses in the installation (transformer, cables). That is why in a system with a relatively high percentage of rectifier load it is important to keep the harmonic currents at a low level so as to avoid a transformer overload and high cable temperature. For the purpose of ensuring low harmonic currents, the units are fitted with coils in their intermediate circuit as standard. This reduces the input current I_{RMS} by typically 40 %.

■ Display unit

On the FCD 300 unit there are 5 indicator lamps for voltage (ON), warning, alarm, status and bus.

In addition, a plug for connecting an LCP control panel is available as an option. The LCP control

panel can be installed up to 3 metres away from the frequency converter, e.g. on a front panel, by means of a mounting kit.
All displays of data are via a 4-line alpha-numerical display, which in normal operation is able to show 4 operating data items and 3 operation modes continuously. During programming, all the information required for quick, efficient parameter Setup of the frequency converter is displayed. As a supplement to the display, the LCP has three indicator lamps for voltage (ON), warning (WARNING) and alarm (ALARM). Most of the frequency converter's parameter Setups can be changed immediately via the LCP control panel. See also the section entitled *The LCP control unit* in the Design Guide.

■ Fieldbus protocols

Danfoss frequency converters are able to fulfill many different functions in a process control system. The frequency converter can be integrated directly in an overall surveillance system, which will allow detailed process data to be transferred via serial communication.
The protocols listed below are based on an RS 485 bus system with a maximum transmission speed of 9600 baud. The following telegram profiles are supported as standard:

- FC protocol, which is a profile adapted to Danfoss.
- Profidrive protocol, which supports the profidrive profile.

See *Serial communication for FCD 300* for further details of telegram profiles.

■ Fieldbus option

The increasing information requirements in industry make it necessary to collect or visualize many different process data. Important process data help the system technician with the daily monitoring of the system. The large amounts of data involved in major systems make a higher transmission speed than 9600 baud desirable.

Profibus is a fieldbus system, which can be used for linking automation devices such as sensors and actuators with the controls by means of a two-conductor cable.
Profibus DP is a very fast communication protocol, made specially for communication between the automation system and various types of equipment. Danfoss FCD 300 can be supplied with the Profibus® DP in a 3 Mbit and a 12 Mbit version. Units with Profibus protocol can either be controlled by FC protocol or Profidrive protocol.

Also available with AS Interface and DeviceNet.

Profibus is a registered trade mark.

MD.04.A3.02 - VLT is a registered Danfoss trademark

■ Ordering numbers for brake resistors

Flatpack brake resistors IP 54

Type	P_{motor} [kW]	R_{MIN} [Ω]	Size [Ω] / [W] per item	Duty cycle %	IP 54 Order no. 175Uxxxx	IP 65 Order no. 175Nxxxx
303 (400 V)	0.37	520	830 Ω / 100 W	20	1000	2397
305 (400 V)	0.55	405	830 Ω / 100 W	20	1000	2397
307 (400 V)	0.75	331	620 Ω / 100 W	14	1001	2396
311 (400 V)	1.10	243	430 Ω / 100 W	8	1002	2395
315 (400 V)	1.50	197	310 Ω / 200 W	16	0984	2400
322 (400 V)	2.20	140	210 Ω / 200 W	9	0987	2399
330 (400 V)	3.00	104	150 Ω / 200 W	5.5	0989	2398
335 (400 V)	3.30	104	150 Ω / 200 W	5.5	0989	2398

Mounting bracket for brake resistors

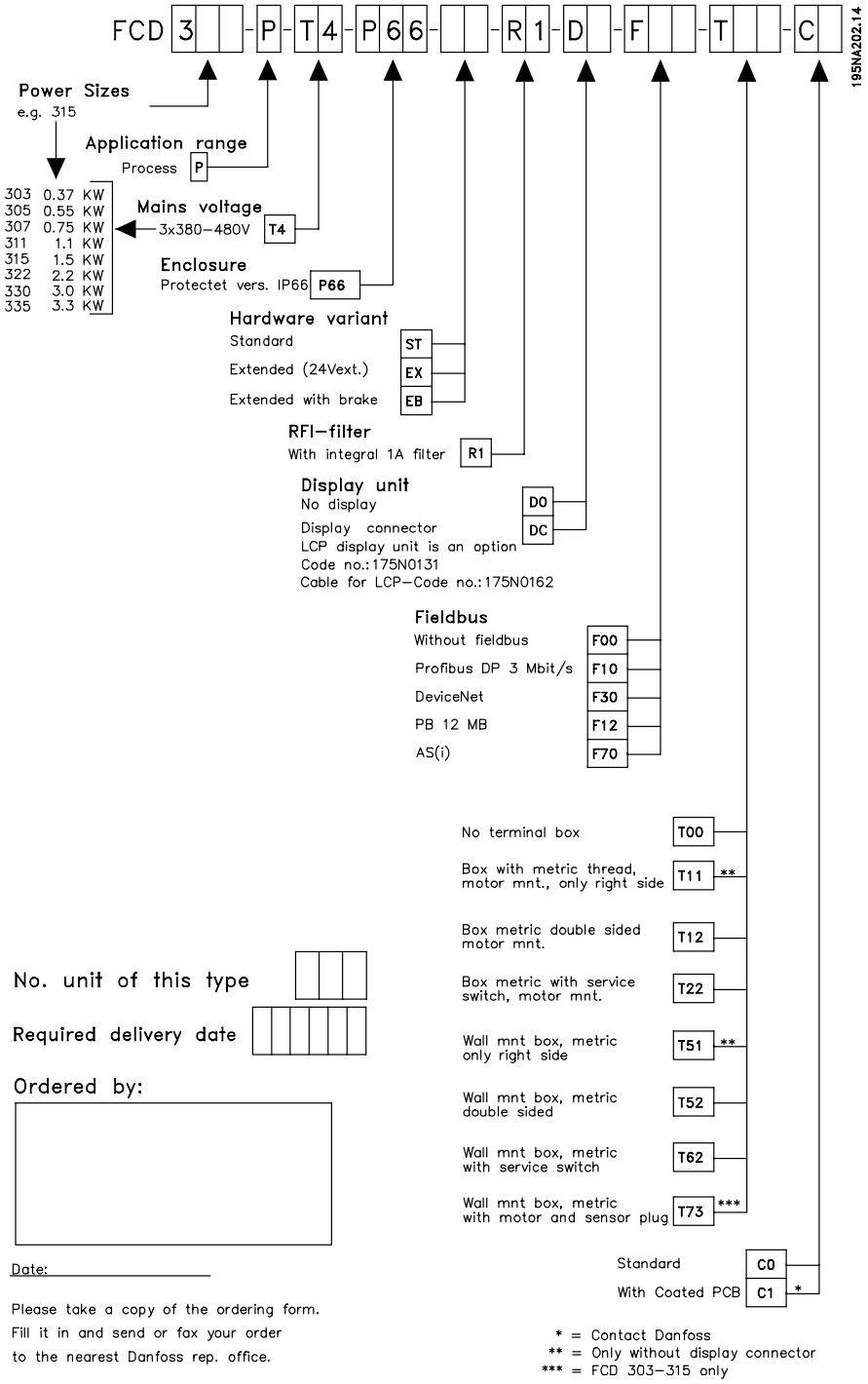
Type	Order no. 175Nxxxx
303-315	2402
322-335	2401

Coiled wire brake resistors Duty-cycle 40%

Type	P_{motor} [kW]	R_{MIN} [Ω]	R_{REC} [Ω]	P_{peak} [kW]	$P_{avg.}$ [kW]	Order no. 175U0xxx
303 (400 V)	0.37	520	830	0.60	0.25	976
305 (400 V)	0.55	405	830	0.60	0.25	976
307 (400 V)	0.75	331	620	0.90	0.36	910
311 (400 V)	1.10	243	430	1.32	0.53	911
315 (400 V)	1.50	197	330	1.80	0.72	912
322 (400 V)	2.20	140	220	2.60	1.06	913
330 (400 V)	3.00	104	150	3.60	1.44	914
335 (400 V)	3.30	104	150	3.60	1.44	914

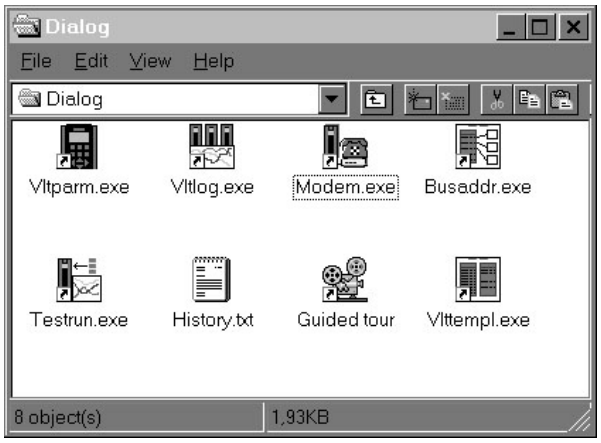
R_{REC} = Recommended brake resistor.
P_{peak} = Max. brake effect at 160% brake torque.
P_{avg} = Mean power based on Duty-cycle.
See dimensions of Coiled wire brake resistors in instructions MI.50.D2.XX.

Externally mounted brake resistors in general
No use of aggressive cleaning solvents. Cleaning solvents must be pH neutral.


FCD 3 - P - T4 - P66 - R1 - D - F - T - C
195NA202.14
Power Sizes
e.g. 315
303 0.37 KW
305 0.55 KW
307 0.75 KW
311 1.1 KW
315 1.5 KW
322 2.2 KW
330 3.0 KW
335 3.3 KW
Application range
Process P
Mains voltage
3x380–480V T4
Enclosure
Protectet vers. IP66 P66
Hardware variant
Standard ST
Extended (24Vext.) EX
Extended with brake EB
RFI–filter
With integral 1A filter R1
Display unit
No display D0
Display connector DC
LCP display unit is an option
Code no.:175N0131
Cable for LCP–Code no.:175N0162
Fieldbus
Without fieldbus F00
Profibus DP 3 Mbit/s F10
DeviceNet F30
PB 12 MB F12
AS(i) F70
No terminal box T00
Box with metric thread, motor mnt., only right side T11 **
Box metric double sided motor mnt. T12
Box metric with service switch, motor mnt. T22
Wall mnt box, metric only right side T51 **
Wall mnt box, metric double sided T52
Wall mnt box, metric with service switch T62
Wall mnt box, metric with motor and sensor plug T73 ***
Standard C0
With Coated PCB C1 *
No. unit of this type
Required delivery date
Ordered by:
Date:
Please take a copy of the ordering form.
Fill it in and send or fax your order
to the nearest Danfoss rep. office.
* = Contact Danfoss
** = Only without display connector
*** = FCD 303–315 only

■ PC software and serial communication

Danfoss offers various options for serial communication. Using serial communication, it is possible to monitor, program and control one or several frequency converters from a centrally located computer.
In addition, all FCD 300 units have an RS 485 port as standard, thereby enabling communication e.g. with a PC. For this purpose, a program called VLT Software Dialog is available.
VLT Software Dialog comes in three modules, as a minimum containing the programs of the Basic module.



The Basic module covers:
TEST RUN used for controlling and running in a frequency converter, including
- Setting of reference value.
- simultaneous showing of selected parameters in the form of graphs.
- option of DDE link, e.g. to spreadsheet.

PARAMETER SETUP is used for setting up and transmitting parameter sets, including:
- setting of frequency converter parameters.
- parameter sets can be collected from and copied to a frequency converter.
- documentation / setup print incl. charts.

HISTORY where the different development stages of VLT Software dialog can be studied.

BUS ADDRESS SETUP is used for addressing FCD 300.

The logging module covers:
LOGGING is used for collecting and displaying historical or real-time operating data.
- presentation of selected parameters from several frequency converters in the form of graphs.
- collection of log data for file.
- option of DDE link, e.g. to spreadsheet.

MODEM SETUP is used to set up the frequency converter's modem. The module sets up the frequency converter's modem via the PC's communication port.

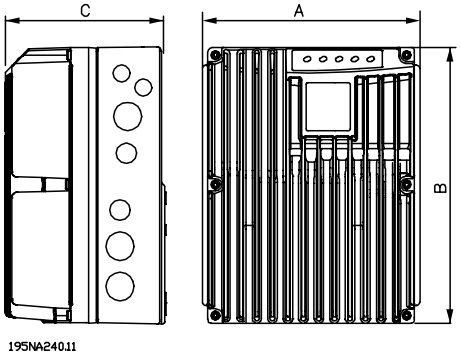
The template module covers:
TEMPLATE SETUP is used for setting up template files for *PARAMETER SETUP*.
- the template file acts as a screen that limits the number of accessible parameters when a parameter file is to be made or edited in *PARAMETER SETUP*.
- the template file may contain preset values for the parameters of the frequency converter

NB!:
The Logging and Template modules call for the Basic module to be installed on the same PC.

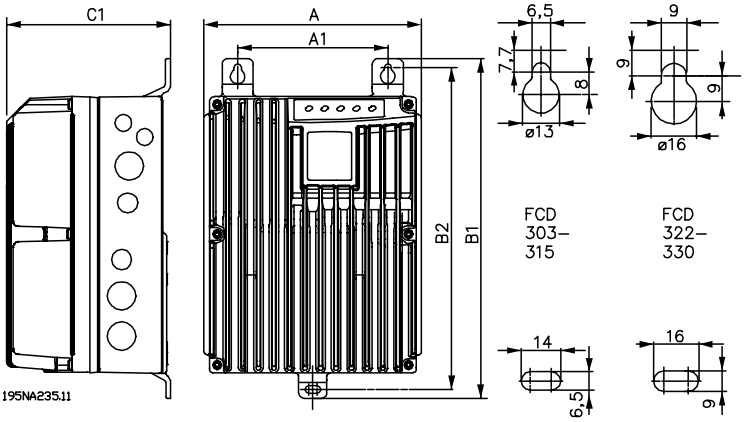
Guided tour covers:
Guided tour offers a demonstration of the VLT Software Dialog program.

Datablad

■ Mechanical dimensions, motor mounting



■ Mechanical dimensions, stand alone mounting

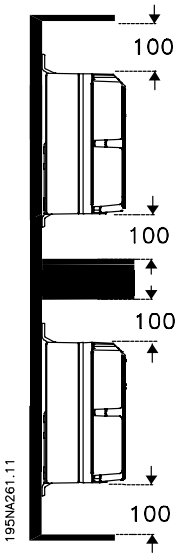


Mechanical dimensions in mm	FCD 303-315	FCD 322-335
A	192	258
A1	133	170
B	244	300
B1	300	367
B2	284	346
C	142	151
C1	145	154
Cable Gland sizes	M16, M20, M25 x 1.5 mm	
Space for cable inlets and service switch handle 100-150 mm		

MD.04.A3.02 - VLT is a registered Danfoss trademark

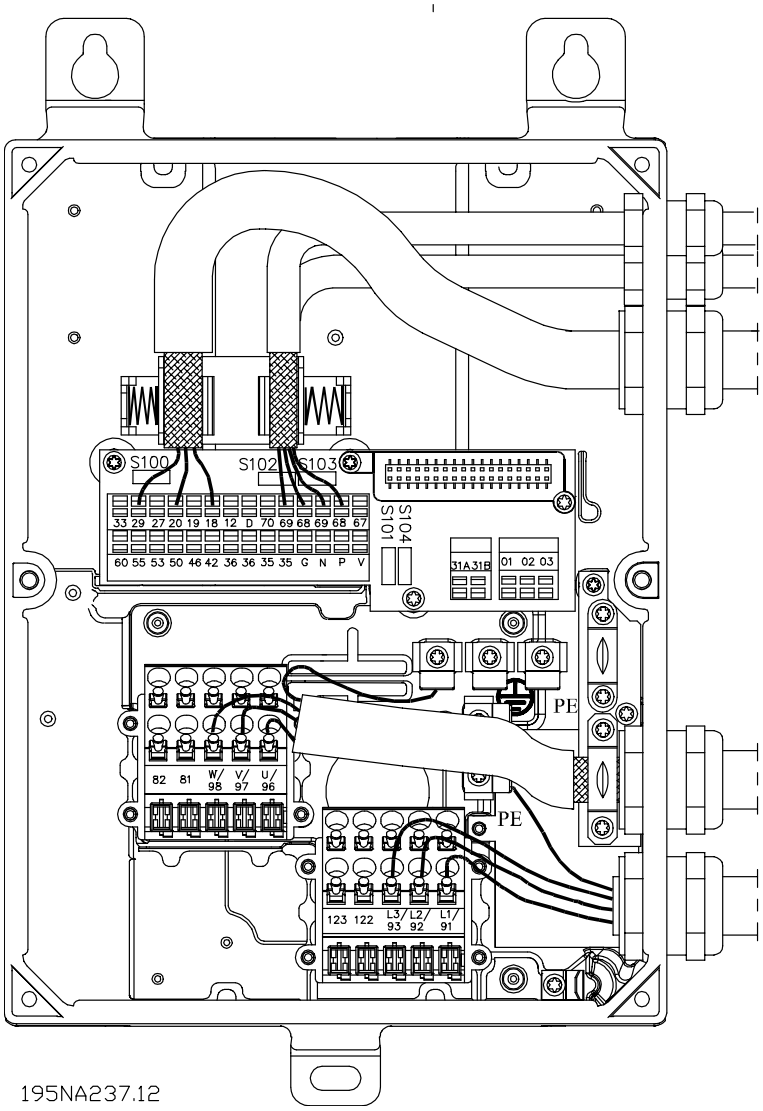
■ Spacing for mechanical installation

All units require a minimum of 100 mm air from other components above and below the enclosure.

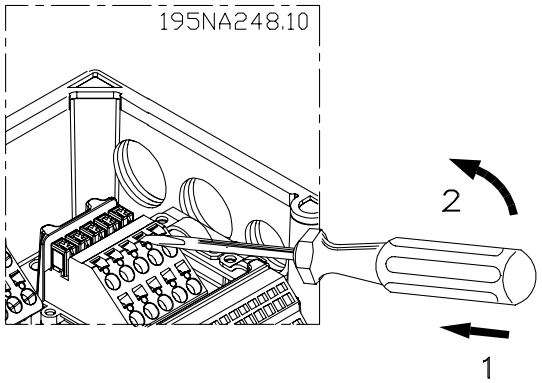


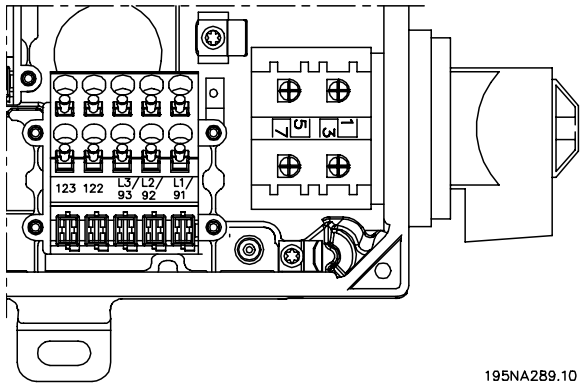
■ Eletrical Installation

T11, T12, T22, T52, T62



195NA237.12





195NA289.10

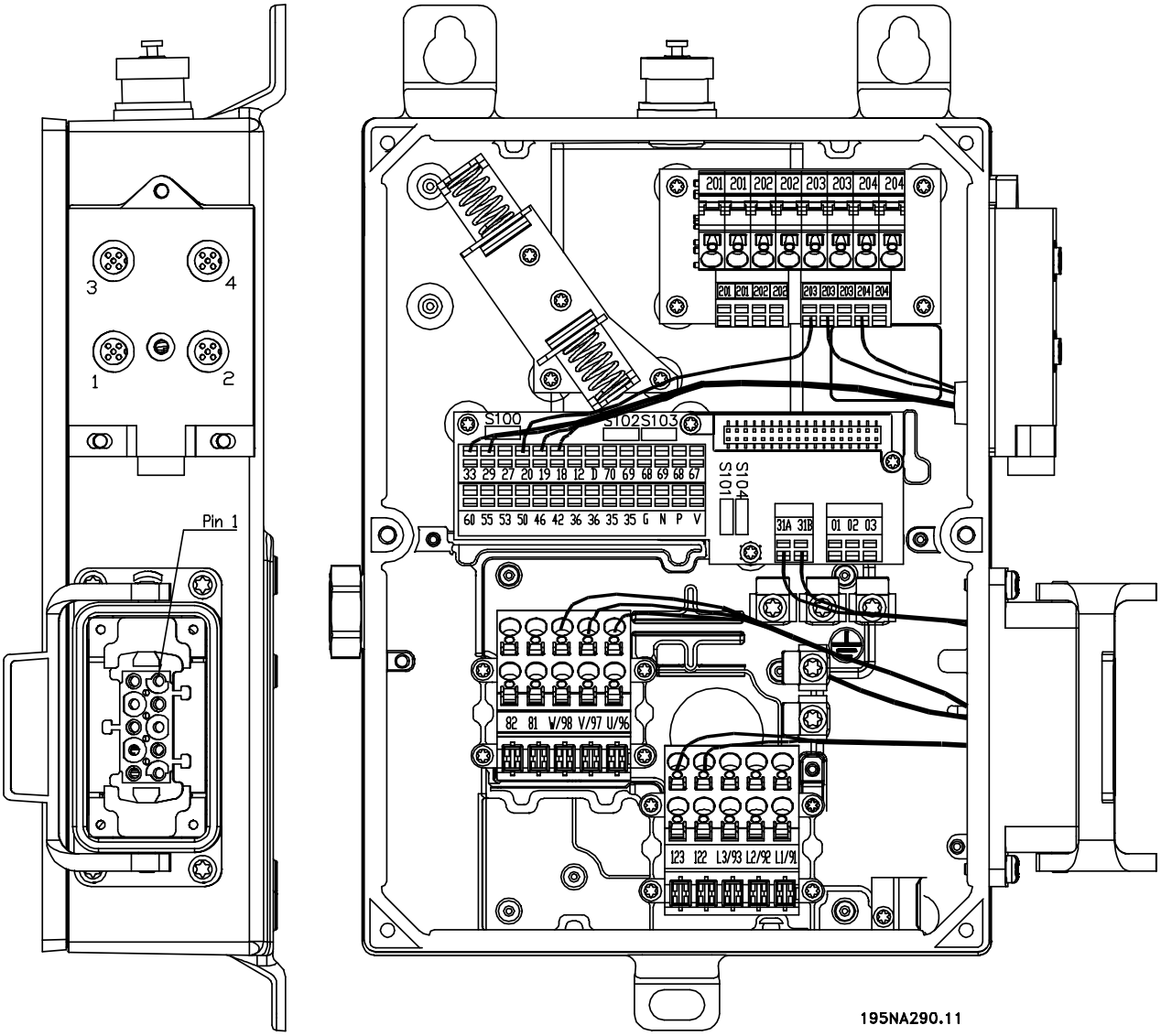
NB!:

Avoid leading the cables over the plugs to the electronics.

Dont loosen screw fixing the spring for the PE connection.

■ **Version with motor plug and sensor plugs , T73**

Version is supplied from Danfoss with wiring as shown.



■ General technical data

Mains supply (L1, L2, L3):

Supply voltage FCD 305-335 380-480 V ..... 3 x 380/400/415/440/480 V ±10%
Supply frequency ..... 50/60 Hz
Max. imbalance on supply voltage ..... ± 2.0% of rated supply voltage
Power factor (400 V) / cos. Φ_1 ..... 0.90 / 1.0 at rated load
Number of connections at supply input L1, L2, L3 ..... 2 times/min.
Max. short-circuit value fuses ..... 100,000 A
Max. short-circuit value circuit brakers ..... 10,000 A
See Special Conditions section in the Design Guide

Output data (U, V, W):

Output voltage ..... 0 - 100% of supply voltage
Output frequency ..... 0.2 - 132 Hz, 1 - 1000 Hz
Rated motor voltage, 380-480 V units ..... 380/400/415/440/460/480 V
Rated motor frequency ..... 50/60 Hz
Switching on output ..... Unlimited
Ramp times ..... 0.02 - 3600 sec.

Torque characteristics:

Starting torque (parameter 101 Torque characteristic = Constant torque) ..... 160% in 1 min.*
Starting torque (parameter 101 Torque characteristics = Variable torque) ..... 160% in 1 min.*
Starting torque (parameter 119 *High starting torque*) ..... 180% for 0.5 sec.*
Overload torque (parameter 101 Torque characteristic = Constant torque) 160%*
Overload torque (parameter 101 Torque characteristic = Variable torque) 160%*
**Percentage relates to frequency converter's nominal current.*

Control card, digital inputs:

Number of programmable digital inputs 5
Terminal number 18, 19, 27, 29, 33
Voltage level ..... 0 - 24 V DC (PNP positive logic)
Voltage level, logic '0' ..... < 5 V DC
Voltage level, logic '1' ..... > 10 V DC
Maximum voltage on input ..... 28 V DC
Input resistance, R_i (terminals 18, 19, 27) ..... approx. 4 kΩ
Input resistance, R_i (terminal 29, 33) ..... approx. 2 kΩ
All digital inputs are galvanically isolated from the supply voltage (PELV) and other high-voltage terminals, and can be functionally separated from other control terminals by opening switch S100. See section entitled Galvanic Isolation.

MD.04.A3.02 - VLT is a registered Danfoss trademark

Control card, analogue inputs:

Number of analogue voltage inputs ..... 1 pcs.
Terminal number 53
Voltage level ..... ± 0 - 10 V DC (scaleable)
Input resistance, R_i ..... approx. 10 kΩ
Max. voltage ..... 20 V

Number of analogue current inputs ..... 1 pcs.
Terminal number 60
Current level ..... 0/4 - 20 mA (scaleable)
Input resistance, R_i ..... approx. 300 Ω
Max. current ..... 30 mA

Resolution for analogue inputs ..... 10 bit
Accuracy of analogue inputs ..... Max. error 1% of full scale
Scan interval ..... 13.3 msec
The analogue inputs are galvanically isolated from the supply voltage (PELV) and other high-voltage terminals. See section entitled Galvanic Isolation.

Control card, pulse inputs:

Number of programmable pulse inputs 2
Terminal number 29, 33
Max. frequency at terminal 29/33 ..... 110 kHz (Push-pull)
Max. frequency at terminal 29/33 ..... 5 kHz (open collector)
Min. frequency at terminal 33 ..... 4 Hz
Min. frequency at terminal 29 ..... 30 Hz
Voltage level ..... 0 - 24 V DC (PNP positive logic)
Voltage level, logic '0' ..... < 5 V DC
Voltage level, logic '1' ..... > 10 V DC
Maximum voltage on input ..... 28 V DC
Input resistance, R_i ..... approx. 2 kΩ
Scan interval ..... 13.3 msec
Resolution ..... 10 bit
Accuracy (100 Hz- 1 kHz) terminal 33 ..... Max. error: 0.5% of full scale
Accuracy (1 kHz - 67.6 kHz) terminal 33 ..... Max. error: 0.1% of full scale
The pulse input is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals. See section entitled Galvanic Isolation.

Control card, digital/frequency output:

Number of programmable digital/pulse outputs ..... 1 pcs.
Terminal number 46
Voltage level at digital/frequency output ..... 0 - 24 V DC (O.C PNP)
Max. output current at digital/frequency output ..... 25 mA.
Max. load at digital/frequency output ..... 1 kΩ
Max. capacity at frequency output ..... 10 nF
Minimum output frequency at frequency output ..... 16 Hz
Maximum output frequency at frequency output ..... 10 kHz
Accuracy on frequency output ..... Max. error: 0.2 % of full scale
Resolution on frequency output ..... 10 bit
The digital output is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals. See section entitled Galvanic Isolation.

Control card, analog output:

Number of programmable analog outputs 1
Terminal number 42
Current range at analog output ..... 0/4 - 20 mA
Max. load to common at analog output ..... 500 Ω
Accuracy on analog output ..... Max. error: 1.5 % of full scale
Resolution on analog output ..... 10 bit
The analog output is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals. See section entitled Galvanic Isolation.

Control card, 24 V DC output:

Terminal number 12
Max. load supplied from mains / 24 V external ..... 240/65 mA
The 24 V DC supply is galvanically isolated from the supply voltage (PELV) , but has the same potential as the analogue and digital inputs and outputs. See section entitled Galvanic Isolation.

Control card, 10 V DC output:

Terminal number 50
Output voltage ..... 10.5 V ±0.5 V
Max. load ..... 15 mA
The 10 V DC supply is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals. See section entitled Galvanic Isolation.

Control card, RS 485 serial communication:

Terminal number ..... 68 (TX+, RX+), 69 (TX-, RX-)
Terminal number 67 ..... + 5 V
Terminal number 70 ..... Common for terminals 67, 68 and 69
Full galvanic isolation. See section entitled Galvanic Isolation.

Relay outputs:

Number of programmable relay outputs 1
Terminal number, control card ..... 1-3 (break), 1-2 (make)
Max. terminal load (AC) on 1-3, 1-2, control card ..... 240 V AC, 2 A
Min. terminal load on 1-3, 1-2, control card ..... 24 V DC 10 mA, 24 V AC 100 mA
The relay contact is separated from the rest of the circuit by strengthened isolation.
See section entitled Galvanic Isolation.

External 24 Volt DC supply:

Terminal nos 35, 36
Voltage range ..... 21-30 V (max. 37 V DC for 10 sec.)
Max. voltage ripple ..... 2 V DC
Power consumption with/without mains supply 0.1W/5-12W
Reliable galvanic isolation: Full galvanic isolation if the external 24 V DC supply is also of the PELV type.

Sensor supply (T73) :

Terminal nos 201, 202, 203, 204

MD.04.A3.02 - VLT is a registered Danfoss trademark

Cable lengths and cross sections:

Max. motor cable length, screened/armoured cable ..... 10 m
Max. motor cable length, unscreened/unarmoured cable ..... 10 m
Max. cross section to motor, see next section.
Max. cross section to control wires, rigid wire ..... 4.0 mm^2/10 AWG
Max. cross section to control cables, flexible cable ..... 2.5 mm^2/12 AWG
Max. cross section to control cables, cable with ferrules ..... 2.5 mm^2/12 AWG
Max. cross section extra terminals for 24 V ext, T73 version, rigid cables ..... 6.0 mm^2/9 AWG
Max. cross section extra terminals for 24 V ext, T73 version, flexible cable ..... 4 mm^2/10 AWG
Max. cross section extra terminals for 24 V ext, T73 version, cable with ferrules ..... 4 mm^2/10 AWG
Max. cross section PE ..... 10 mm^2/7 AWG
Max. cross section external PE for T73 version ..... 16 mm^2/ 5 AWG
If UL/cUL is to be complied with, cable with temperature class 60/75°C must be used. Use copper wires only.
When complying with EN 55011 1A the motor cable must be screened/armoured. See EMC emission.

Control characteristics:

Frequency range ..... 0.2 - 132 Hz, 1 - 1000 Hz
Resolution of output frequency ..... 0.013 Hz, 0.2 - 1000 Hz
Repeat accuracy of *Precise start/stop* (terminals 18, 19) ..... ≤ ± 0.5 msec
System response time (terminals 18, 19, 27, 29, 33) ..... ≤ 26.6 msec
Speed control range (open loop) ..... 1:15 of synchronous speed
Speed control range (closed loop) ..... 1:120 of synchronous speed
Speed accuracy (open loop) <1.1 kW ..... 150 - 3600 rpm: Max. error of ±23 rpm
Speed accuracy (open loop) >0.75 kW ..... 90 - 3600 rpm: Max. error of ±23 rpm
Speed accuracy (closed loop) ..... 30 - 3600 rpm: Max. error of ±7.5 rpm
All control characteristics are based on a 4-pole asynchronous motor

Surroundings:

Enclosure ..... IP 66, TYPE 4x (indoor)
Enclosure T73 version ..... IP 65, TYPE 12
Vibration test ..... 1.0 g
Max. relative humidity ..... 95% *see Air humidity in the Design Guide*
Ambient temperature (FCD 335 max. 35 °C) ..... Max. 40 °C (24-hour average max. 35 °C)
Derating for ambient temperature, see special conditions in the Design Guide
Min. ambient temperature during full-scale 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 air pressure, see special conditions in the Design Guide
EMC standards used, Emission ..... EN 50081-1-2, EN 61800-3, EN 55011
EMC standards used, 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
See section on special conditions in the Design Guide

Safeguards:

- Electronic thermal motor protection against overload.
- Temperature monitoring of the power module ensures that the frequency converter cuts out if the temperature reaches 100 °C. An overload temperature cannot be reset until the temperature of the power module is below 70 °C.
- The frequency converter is protected against short-circuits on motor terminals U, V, W.
- If a mains phase is missing, the frequency converter will cut out.
- Monitoring of the intermediate circuit voltage ensures that the frequency converter cuts out if the intermediate circuit voltage is too low or too high.
- The frequency converter is protected against earth fault on motor terminals U, V, W.

■ Technical data, mains supply 3 x 380 - 480 V

According to international standards	Type	303	305	307	311	315	322	330	335**
Output current	$I_{INV.}$ [A]	1.4	1.8	2.2	3.0	3.7	5.2	7.0	7.6
(3 x 380-480V)	I_{MAX} (60s) [A]	2.2	2.9	3.5	4.8	5.9	8.3	11.2	11.4
Output power (400 V)	$S_{INV.}$ [KVA]	1.0	1.2	1.5	2.0	2.6	3.6	4.8	5.3
Typical shaft output	$P_{M,N}$ [kW]	0.37	0.55	0.75	1.1	1.5	2.2	3.0	3.3
Typical shaft output	$P_{M,N}$ [HP]	0.50	0.75	1.0	1.5	2.0	3.0	4.0	5*
Max. cable cross section, motor	[mm^2/AWG] 1)	4/10	4/10	4/10	4/10	4/10	4/10	4/10	4/10
Input current	$I_{L,N}$ [A]	1.2	1.6	1.9	2.6	3.2	4.7	6.1	6.8
(3 x 380-480 V)	$I_{L,MAX}$(60s)[A]	1.9	2.6	3.0	4.2	5.1	7.5	9.8	10.2
Max. cable cross section, power	[mm^2/AWG] 1)	4/10	4/10	4/10	4/10	4/10	4/10	4/10	4/10
Max. pre-fuses	[IEC]/UL 2) [A]	25/25	25/25	25/25	25/25	25/25	25/25	25/25	25/25
Efficiency3)	[%]	96							
Power loss at max. load	[W]	22	29	40	59	80	117	160	190
Weight	[kg]	5.8	5.8	5.8	5.8	5.8	7.0	7.0	7.0

* At mains voltage min 3 x 460 - 480 V

** t_{amb} max. 35° C.

1. American Wire Gauge. Max. cable cross section is the largest cable cross section that can be attached to the terminals. Always observe national and local regulations.
2. Type gG pre-fuses must be used. If you want to maintain UL/cUL branch circuit fuses according to NEC should be used. The fuses must be placed for protection in a circuit that is capable of supplying a maximum of 100,000 amps RMS (symmetrical), 500 V maximum.
3. Measured using a 10 m screened/armoured motor cable with a rated load and rated frequency.

■ Accessories for FCD 300

Type	Description	Ordering no.
LCP2 control unit	LCP2 for programming the frequency converter	175N0131
Cable for LCP2 control unit	Cable from LCP2 to frequency converter	175N0162
LCP2 remote-mounting kit	Kit for remote-mounting of LCP2 (incl. 3 m cable, excl. LCP2)	175N0160
LOP (Local Operation Pad)	LOP can be used for setting the reference and start/stop via the control terminals.	175N0128
VLT Software Dialog	CD-ROM version*	175Z0953
Motor adaption plate	Plate for adapting to non Danfoss Bauer motors.	175N2115
Membrane	Membrane for preventing condensation.	175N2116
Internal brake resistor for FCD 303-307	Brake resistor for mounting inside the terminal box.	175N2154
Internal brake resistor for FCD 311-335	Brake resistor for mounting inside the terminal box.	175N2117
Plug kit for LCP2	Plug for LCP2 for mounting in the terminal box.	175N2118
Motor star terminal	Terminal for interconnection of motor wires (star point).	175N2119
Installation kit	Installation kit for mounting in panels	175N2207

* Incl. the modules Basis, Logging, Template, Guided Tour in 6 languages (Danish, English, German, Italian, Spanish and French).

MD.04.A3.02 - VLT is a registered Danfoss trademark

■ Supplied with the unit

Below is a list of the literature available for FCD 300. It must be noted that there may be deviations from one country to the next.

Supplied with the unit:

Operating instructions MG.04.BX.YY

Various literature for FCD 300:

Design Guide MG.04.AX.YY
Data sheet MD.04.AX.YY

Communication with FCD 300:

Profibus manual MG.90.AX.YY

X = version number
YY = language version

XREF__BC
NOT LOADED ON RIP

FCD 300



Datasheet

VLT® frequency converters BAUER geared motors

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed.
All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

* M D 0 4 A 3 0 2 *