

ENGINEERING
TOMORROW



Selection Guide | VLT® Micro Drive

Small, powerful and built to last
Save panel space and **reduce**
installation costs

150%

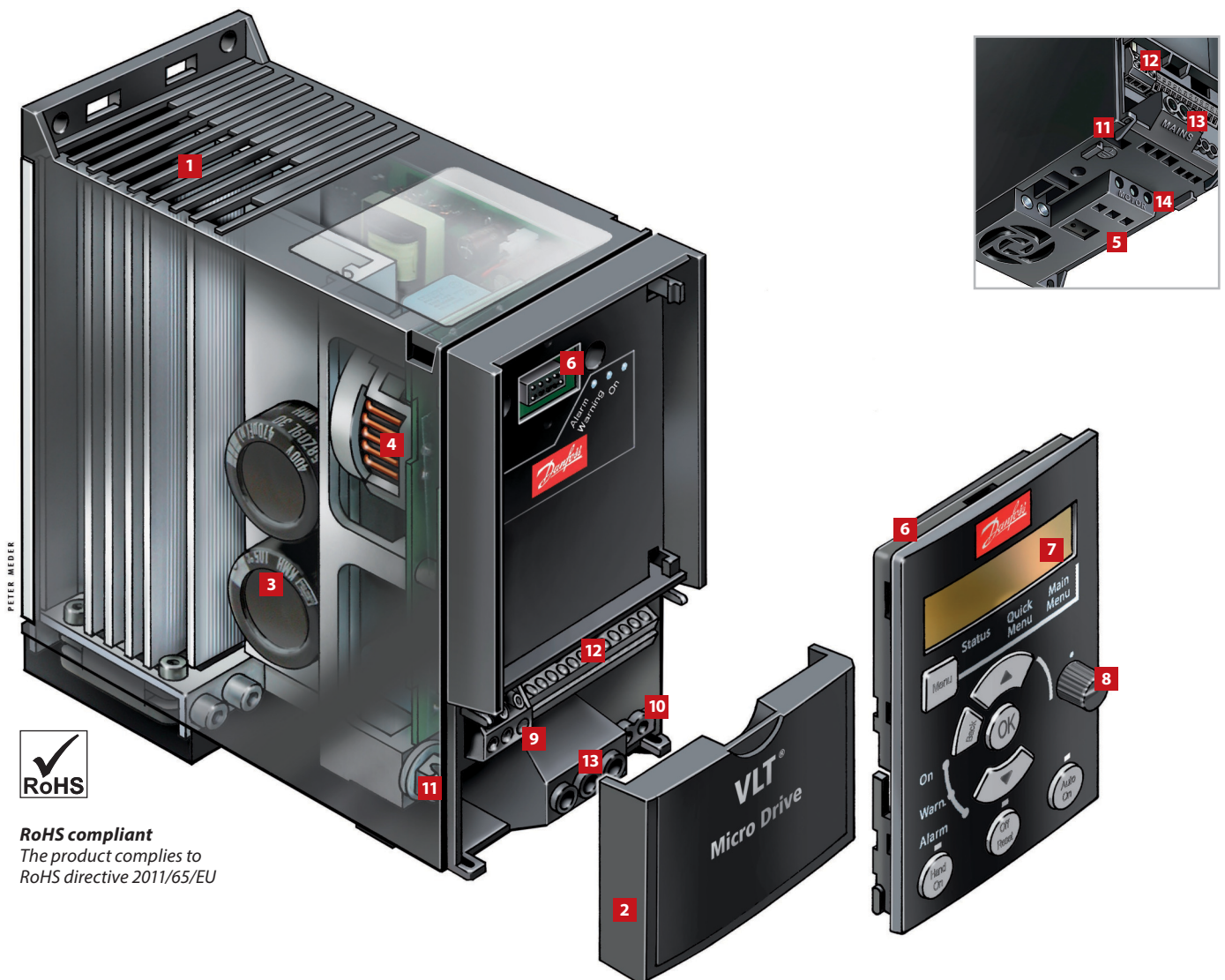
motor torque for up
to 1 minute enables
you to use a smaller
drive without
sacrificing efficiency

drives.danfoss.com

VLT®

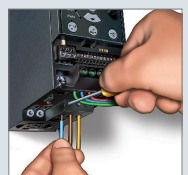
Ready – Steady – Go!

Connect motor and power cables, turn the control knob, and watch the motor speed change



RoHS compliant
The product complies to
RoHS directive 2011/65/EU

- | | |
|---|--|
| 1 Well protected IP 20 enclosure
No forced air flow through electronics | 8 Potentiometer |
| 2 IP 20 even without terminal cover | 9 RS 485 pluggable |
| 3 High quality capacitors | 10 Customer relay screw terminals
Wire inlet from the bottom |
| 4 RFI Filter | 11 Safety earth
– min. 4 mm ² accessible from front |
| 5 DC-link access | 12 I/O terminals |
| 6 Hot pluggable LCP | 13 Mains screw terminals |
| 7 LCD display | 14 Motor screw terminals |



Compact VLT® quality

VLT® Micro Drive is a genuine VLT® frequency converter with unsurpassed reliability, user-friendliness, condensed functionality, and is extremely easy to commission. Terminal numbers are named in the same manner as in the rest of the VLT® family.

Reliable and user friendly

The VLT® Micro Drive is a full member of the VLT® family, sharing the overall quality of design, reliability and user-friendliness.

Small drive – big performance

Despite the compact size and the easy commissioning, a VLT® Micro Drive can be set up to perform perfectly, even in complex application set-ups.

Approximately 100 parameters can be set to optimize energy efficiency and operation.

User friendly

Plug-and-play	Minimum effort – minimum time
Minimum commissioning	Save time
Copy settings via local control panel	Easy set up of multiple drives
Intuitive parameter structure	Minimal manual reading
Complies with VLT® software	Save commissioning time

Reliable

Optimum heat dissipation	Longer lifetime
High quality electronics/capacitors	Low lifetime cost
All drives full load tested from factory	High reliability
Earth fault, temperature and short circuit protection	Lean operation
Circuit boards well protected and coated	Increased robustness

Small drive – high performance

Process PI-controller	No need for external controller
Automatic Energy Optimizer (AEO)	Less energy consumption
Automatic Motor Tuning (AMT)	Exploit motor's full potential
150% motor torque up to 1 minute	Replace need for bigger drive
Flying start (catch a spinning motor)	Lean operation – more up-time
Electronic Thermal relay (ETR)	Replace external motor protection
Smart Logic Controller	Often makes PLC ommissible
Built-in RFI filter	Save cost and space

In- and outputs

- 5 programmable digital inputs
- PNP/NPN selection
- Pulse input 20 – 5000 Hz
- 1 analogue input
0 – 10 V or 0 – 20 mA
- 1 analogue input 0 – 20 mA
- Thermistor input
(analogue/digital)
- 1 analogue output 0 – 20 mA
- 1 relay 240 V AC, 2 A
- RS485 FC-bus
- Modbus RTU

Compact general purpose drive

The VLT® Micro Drive is a general purpose drive that can control AC motors up to 22 kW.



Compact design – Uncompromised quality

Space saving

A compact, book-style design allows side-by-side mounting without derating.

Minimum penetration of dust

VLT® Micro Drives are designed to keep the forced ventilation away from the electronics. Printed circuit boards are well protected inside the drive.

Built-in RFI

Radio disturbance from motor cables is limited with the built-in RFI filter, which allows for 15 m motor cables (screened). Meets EU norms.

Built-in brake functions

With built in DC and AC brake functions, VLT® Micro Drive can transform kinetic energy in the application into braking

power to slow down the motor. A brake chopper is built in the drives from 1.5 kW upwards.

Intelligent heat management

Process heat is removed through the heat sink, leaving electronics protected from dust and dirt from production.

Coated electronics are standard

All VLT® Micro Drives use coated electronics for longer lifetime and reliability.

Effective heat sink

An effective heat sink removes heat from the electronics and extends the lifetime and reliability of the drive.

Energy efficiency 98%

High quality VLT® power modules ensure cool running of the drive due to low losses.

50° ambient temperature

Highly efficient cooling allows up to 50° ambient temperature.



Hot pluggable display – with or without potentiometer

Remote mountable

Illuminated LCD display

Navigation buttons

Indicators
Operation buttons



Two control panel versions. Potentiometer is optional.

The control panels are shown in actual size.
H x W x D = 85 x 65 x 20 mm (D = 28 mm with potentiometer)

- LCP without potentiometer IP 54
- LCP with potentiometer IP 21
- Remote mounting kit
- LCP copy function
- Parameter numbers and values visible simultaneously
- Unit indications (A., V, Hz, RPM, %, s, HP and kW)
- Rotation direction indication
- Setup indication – 2 setups
- Removable during operation
- Up- and download functionality

Large figures, easy to read

- Display readable from distance
- Operation buttons are illuminated when active

Quick Menus

- A Danfoss defined Quick Menu
- Basic settings
- PI controller

Menu structure

- Based on the well-known matrix from the VLT® family
- Easy shortcut for the experienced user
- Edit and operate in different set-ups simultaneously

Built-in Smart Logic Controller

The smart logic controller is a simple, yet clever, way to make your drive, motor and application work seamlessly together.

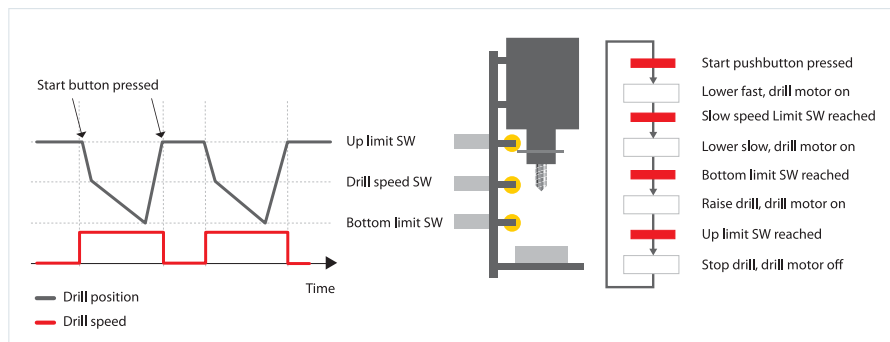
The smart logic controller is able to monitor any parameter that can be characterized as "true" or "false".

This includes digital commands and also logic expressions, which allow even sensor outputs to influence the operation.

Temperature, pressure, flow, time, load, frequency, voltage and other

parameters combined with the operators ">", "<", "=", "and" and "or" form logic expressions that are true or false. That is why Danfoss calls it a "logic"

controller. As a result of this, you can program the controller to react to literally any event.



Option – VLT® Line Filter MCC 107

Improve both the low and high frequency performance of the line current to the drive with the optional VLT® Micro Drive Line Filter, which boosts efficiency by combining a harmonic filter and an EMC filter.

Increased drive lifetime

Reducing the voltage ripple on the DC link will result in higher reliability and longer drive lifetime. Under similar running conditions (temperature, load), the expected lifetime of the DC capacitors may be extended by 2-3 times.

Improved power-factor

The VLT® Line Filter reduces the RMS value of line current. A smaller line current means higher true power-factor (PF). Typically, line current can be reduced by more than 40% and improve PF from 0.4 to 0.7 for single-phase drives and 0.47 to 0.9 for three-phase drives.

Improved high frequency conduction EMC performance

The VLT® Line Filter ensures compliance with EN55011 class A1 for up to 50 m of motor cable, and class B up to 10 m of motor cable.

That means the VLT® Micro Drive + VLT® Line Filter, has an outstanding EMC performance in the micro-inverter class, even with relatively long motor cables.

High immunity against grid disturbances

The line filter will reduce the harmonic current drawn from the grid. The drive will comply with IEC 61000-2-2 and IEC 6100-2-4 without power derating, including 15% harmonic voltage distortion, 3% voltage imbalance and commutation notches, as described in IEC 60146-1. With the line filter, the performance of the immunity to the surge and burst impact of the drive stated in IEC 61800-3 will be greatly improved.

One filter for several drives

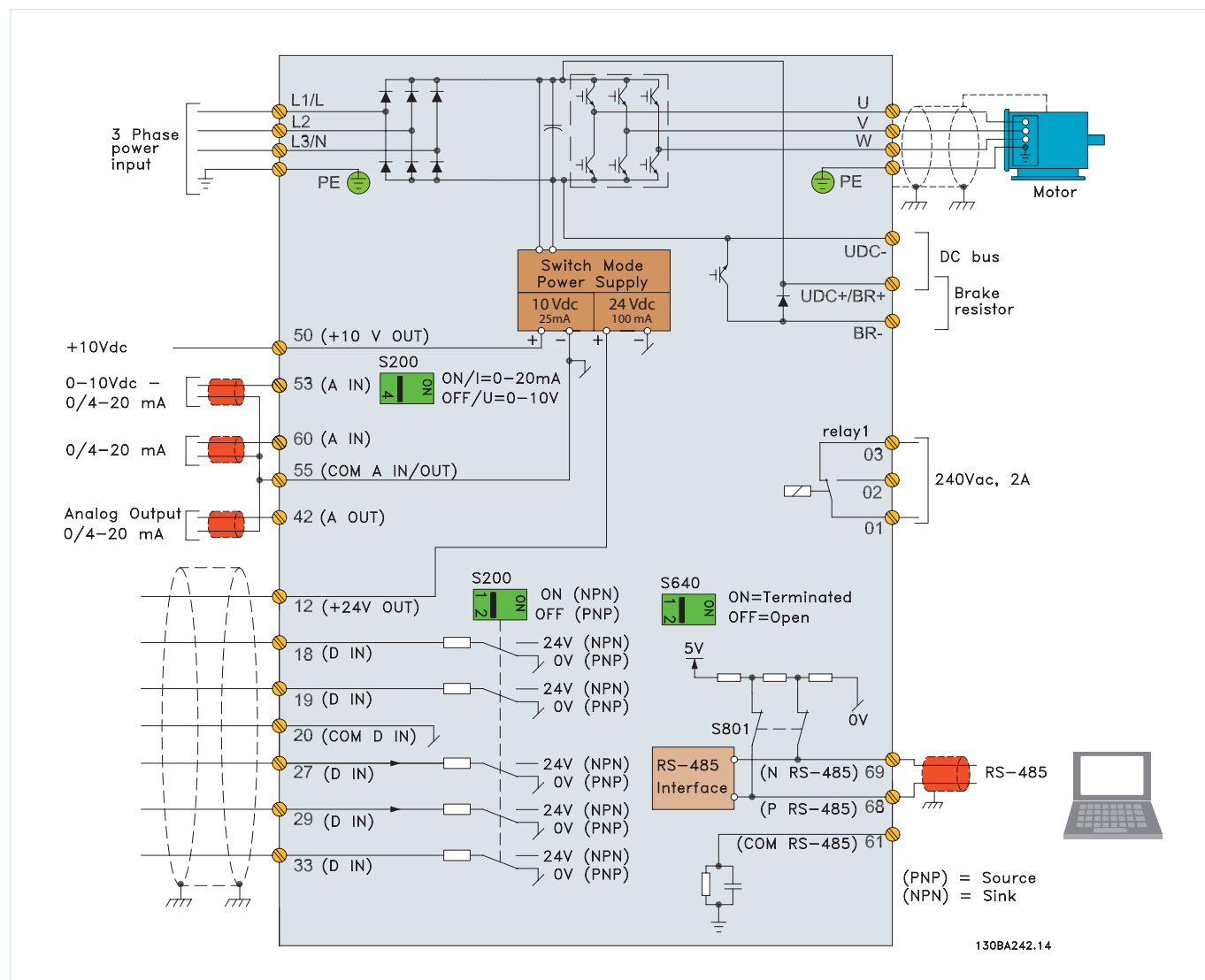
The line filter can be used for filtering several small VLT® Micro Drives. In this case the line filter should be derated by one size.

Example: 1 x FC 51 400 V/1.5 kW + 1 x FC 51 400 V/1,5 kW -> total 3.0 kW + derating one size up: select filter 400 V/4.0 kW.



Frame sizes
Three different frame sizes of line filters correspond to the M1, M2 and M3 enclosures of the VLT® Micro Drive

Connections

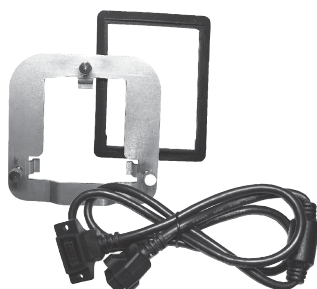


Accessories



Set-up software

The VLT® Motion Control Tool MCT 10 Setup Software exploits the full functionality of your PC, providing a general overview and control of even large systems.



Remote mounting kit

A dedicated mounting kit is available for mounting the local control panel (LCP) in the cabinet door.

Code numbers

VLT® Control panel LCP 11
W/o potentiometer..... 132B0100

VLT® Control panel LCP 12
With potentiometer..... 132B0101

Remote mounting kit
incl. 3 m cable..... 132B0102

Decoupling plate
For EMC optimized installation.

Dedicated external filters are available on request.

Specifications

Mains supply (L1, L2, L3)	
Supply voltage	1 x 200–240 V ± 10%, 3 x 200–240 V ± 10% 3 x 380–480 V ± 10%
Supply frequency	50/60 Hz
Displacement Power Factor (cos φ) near unity	(> 0.98)
Switching on input supply L1, L2, L3	1–2 times/min.

Output data (U, V, W)	
Output voltage	0–100% of supply voltage
Output frequency	0–200 Hz (VVC+ mode) 0–400 Hz (U/f mode)
Switching on output	Unlimited
Ramp times	0.05–3600 sec

Digital inputs	
Programmable inputs	5
Logic	PNP or NPN
Voltage level	0–24 V
Maximum voltage on input	28 V DC
Input Resistance, Ri	Approx. 4 kΩ

Pulse inputs	
Programmable pulse inputs	1
Voltage level	0–24 V DC (PNP positive logic)
Pulse input accuracy (0.1–110 kHz)	Max. error: 0.1% of full scale
Pulse input frequency	20–5000 Hz

Analog input	
Analog inputs	2
Modes	1 current/1 voltage or current
Voltage level	0–10 V (scaleable)
Current level	0/4–20 mA (scaleable)

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

Ordering Numbers

Power [kW]	200–240 V			380–480 V	
	Current [I-nom.]	1 ph.	3 ph.	Current [I-nom.]	3 ph.
0.18	1.2	132F 0001			
0.25	1.5		132F 0008		
0.37	2.2	132F 0002	132F 0009	1.2	132F 0017
0.75	4.2	132F 0003	132F 0010	2.2	132F 0018
1.5	6.8	132F 0005	132F 0012	3.7	132F 0020
2.2	9.6	132F 0007	132F 0014	5.3	132F 0022
3.0				7.2	132F 0024
3.7	15.2		132F 0016		
4.0	Micro drives from 1.5 kW and up have built in brake chopper			9.0	132F 0026
5.5				12.0	132F 0028
7.5				15.5	132F 0030
11.0				23.0	132F 0058
15.0				31.0	132F 0059
18.5				37.0	132F 0060
22.0				43.0	132F 0061

On-board power supply	
Output voltage	10.5 ± 0.5 V, 24 ± 0.5 V
Max. load (10 V)	25 mA
Max. load (24 V)	100 mA

Relay outputs	
Programmable relay outputs	1
Max. terminal load	240 V AC, 2 A

Fieldbus communication	
FC Protocol, Modbus RTU	

Cable lengths	
Max. motor cable length, screened (shielded)	15 m
Max. motor cable length, unscreened (unshielded)	50 m

Surroundings/ External	
Enclosure	IP 20
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), coated class 3C3
Ambient temperature	Max. 50° C
24-hour average	Max. 40° C

Approvals	
CE, C-tick, UL	

Protection and features	
- Electronic thermal motor protection against overload - Temperature monitoring of the heat sink protects the drive from overheating - The drive is protected against short-circuits on motor terminals U, V, W - The drive is protected against earth fault on motor terminals U, V, W	



Cabinet sizes (mounting flange incl.)

[mm]	M1	M2	M3	M4	M5
Height	150	176	239	292	335
Width	70	75	90	125	165
Depth	148	168	194	241	248

+ 6 mm with potentiometer



A better tomorrow is **driven by drives**

Danfoss Drives is a world leader in variable speed control of electric motors.

We offer you unparalleled competitive edge through quality, application-optimized products and a comprehensive range of product lifecycle services.

You can rely on us to share your goals. Striving for the best possible performance in your applications is our focus. We achieve this by providing the innovative products and application know-how required to optimize efficiency, enhance usability, and reduce complexity.

From supplying individual drive components to planning and delivering complete drive systems; our experts are ready to support you all the way.

You will find it easy to do business with us. Online, and locally in more than 50 countries, our experts are never far away, reacting fast when you need them.

You gain the benefit of decades of experience, since 1968. Our low voltage and medium voltage AC drives are used with all major motor brands and technologies in power sizes from small to large.

VACON® drives combine innovation and high durability for the sustainable industries of tomorrow.

For long lifetime, top performance, and full-throttle process throughput, equip your demanding process industries and marine applications with VACON® single or system drives.

- Marine and Offshore
- Oil and Gas
- Metals
- Mining and Minerals
- Pulp and Paper

- Energy
- Elevators and Escalators
- Chemical
- Other heavy-duty industries

VLT® drives play a key role in rapid urbanization through an uninterrupted cold chain, fresh food supply, building comfort, clean water and environmental protection.

Outmaneuvering other precision drives, they excel, with remarkable fit, functionality and diverse connectivity.

- Food and Beverage
- Water and Wastewater
- HVAC
- Refrigeration
- Material Handling
- Textile

VLT® | VACON®

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