

# VLT® HVAC Drive

The VLT® HVAC Drive series is available in a wide power range designed for all HVAC applications. An advanced drive built on HVAC dedication.



The VLT® HVAC Drive is a full-featured, HVAC dedicated drive with built-in intelligence.

The VLT® HVAC Drive has a vast number of functions developed to meet the diverse needs of the HVAC business.

It is the perfect match for pumps, fans and compressors in modern buildings that are fitted with increasingly sophisticated solutions.

## Product range:

|                      |               |
|----------------------|---------------|
| 3 x 200 – 240 V..... | 1.1 – 45 kW   |
| 3 x 380 – 480 V..... | 1.1 – 1000 kW |
| 3 x 525 – 600 V..... | 1.1 – 90 kW   |
| 3 x 525 – 690 V..... | 45 – 1400 kW  |

*With 110% over load torque*

## Available enclosure ratings:

|                              |               |
|------------------------------|---------------|
| IP 00 .....                  | 45 – 630 kW   |
| IP 20.....                   | 1.1 – 400 kW  |
| IP 21 (NEMA 1) .....         | 1.1 – 1400 kW |
| IP 54 (NEMA 12).....         | 55 – 1400 kW  |
| IP 55 (NEMA 12).....         | 1.1 – 90 kW   |
| IP 66 (NEMA 4X indoor) ..... | 1.1 – 90 kW   |

*Optional coating providing extra protection for aggressive environments.*

| Feature                                                          | Benefit                                                           |
|------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>All built-in – low investment</b>                             |                                                                   |
| Modular product concept with a wide range of options             | Low initial investment – max. flexibility, later upgrade possible |
| Dedicated HVAC I/O functionality for temperature sensors etc.    | External conversion saved                                         |
| Decentral I/O control via serial communication                   | Reduced wiring costs, and external controller I/O saved           |
| Wide range of HVAC protocols for BMS controller connectivity     | Less extra gateway solutions needed                               |
| 4 x auto tuned PID's                                             | No external PID controller needed                                 |
| Smart Logic Controller                                           | Often makes PLC unnecessary                                       |
| Real Time Clock                                                  | Enables daily and weekly settings                                 |
| Integrated fan, pump and compressor functionality i.e.           | Saves external control and conversion equipment                   |
| Fire Override Mode, Dry run Detection, Constant Torque etc.      | Protects equipment and saves energy                               |
| Back-channel cooling for frame D, E and F frame                  | Prolonged lifetime of electronics                                 |
| <b>Save energy – less operation cost</b>                         |                                                                   |
| Automatic Energy Optimizer function, advanced version            | Saves 5 – 15% energy                                              |
| Advanced energy monitoring                                       | Overview on energy consumption                                    |
| Energy saving functions i.e. flow compensation, sleep mode etc.  | Saves energy                                                      |
| <b>Unequalled robustness – maximum uptime</b>                    |                                                                   |
| Robust single enclosure                                          | Maintenance-free                                                  |
| Unique cooling concept with no ambient air flow over electronics | Problem-free operation in harsh environments                      |
| Max ambient temp. 50°C without derating (D-frame 45°C)           | No external cooling or oversize necessary                         |
| <b>User-friendly – save commissioning and operating cost</b>     |                                                                   |
| Smart start                                                      | Quick and precise start-up                                        |
| Awarded graphical display, 27 languages                          | Effective commissioning and operation                             |
| USB plug and play connection                                     | Easy to use PC software tools                                     |
| Global HVAC support organisation                                 | Local service – globally                                          |
| <b>Built-in DC coils and RFI filters – no EMC concerns</b>       |                                                                   |
| Integrated DC link harmonic filters                              | Small power cables. Meets EN 61000-3-12                           |
| Integrated EMC filters                                           | Meets EN 55011 Class B, A1 or A2                                  |

## Application options

A wide range of integrated HVAC options can be fitted in the drive:

### VLT® General Purpose I/O MCB 101

3 digital inputs, 2 digital outputs, 1 analogue current output, 2 analogue voltage inputs.

### VLT® Relay Card MCB 105

Adds 3 relay outputs.

### VLT® Analog I/O MCB 109

3 Pt1000/Ni1000 inputs, 3 analogue voltage outputs and back-up power for Real-Time Clock.

### VLT® 24 V External Supply MCB 107

24 VDC external supply can be connected to supply, control and option cards.

### Sensor input card

Sensor input card for motor protection with 2 or 3 PT100 or PT1000 inputs (VLT® Sensor Input MCB 114).

### Brake chopper (IGBT) option

Connected to an external brake resistor, the built-in brake chopper limits the load on the intermediate circuit in the case the motor acts as a generator.

## Power options

A wide range of external power options are available for VLT® HVAC Drives in critical networks or applications:

- **Advanced harmonic filters:** For critical demands on harmonic distortion
- **dU/dt filters:** For special demands on motor isolation protection
- **Sine wave filters**

## HVAC PC software tools

- **VLT® Motion Control Tool MCT 10:** Ideal for commissioning and servicing the drive
- **VLT® Energy Box:** Comprehensive energy analysis tool. Energy consumption with and without drive can be calculated (drive payback time). Online function for accessing drives energy log.
- **VLT® Motion Control Tool MCT 31:** Harmonics calculation tool

## Specifications

### Mains supply (L1, L2, L3)

|                                                    |                                                                                                      |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Supply voltage                                     | 200 – 240 V $\pm 10\%$<br>380 – 480 V $\pm 10\%$<br>525 – 600 V $\pm 10\%$<br>525 – 690 V $\pm 10\%$ |
| Supply frequency                                   | 50/60 Hz                                                                                             |
| Displacement Power Factor (cos $\phi$ ) 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 |
| Switching on output | Unlimited                |
| Ramp times          | 1–3600 sec.              |
| Output frequency    | 0–590 Hz                 |

### Digital inputs

|                             |            |
|-----------------------------|------------|
| Programmable digital inputs | 6*         |
| Logic                       | PNP or NPN |
| Voltage level               | 0–24 VDC   |

\* 2 can be used as digital outputs

### Pulse inputs

|                           |                               |
|---------------------------|-------------------------------|
| Programmable pulse inputs | 2*                            |
| Voltage level             | 0–24 VDC (PNP positive logic) |
| Pulse input accuracy      | (0.1–110 kHz)                 |

\* Utilize some of the digital inputs

### Analogue input

|                 |                          |
|-----------------|--------------------------|
| Analogue inputs | 2                        |
| Modes           | Voltage or current       |
| Voltage level   | 0 V to +10 V (scaleable) |
| Current level   | 0/4 to 20 mA (scaleable) |

### Analogue output

|                                  |           |
|----------------------------------|-----------|
| Programmable analogue outputs    | 1         |
| Current range at analogue output | 0/4–20 mA |

### Relay outputs

|                            |                                   |
|----------------------------|-----------------------------------|
| Programmable relay outputs | 2 (240 VAC, 2 A and 400 VAC, 2 A) |
|----------------------------|-----------------------------------|

### Fieldbus communication

|                                                                                                |                                                                                                  |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Standard built-in:<br>FC Protocol<br>N2 Metasys<br>FLN Apogee<br>Modbus RTU<br>BACnet embedded | Optional:<br>LonWorks (MCA 108)<br>BACnet (MCA 109)<br>DeviceNet (MCA 104)<br>Profibus (MCA 101) |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|

## High power options

- IEC Emergency stop with Safety Relay
- Safety Stop with Safety Relay
- RFI filter
- NAMUR terminals
- RCD
- IRM
- Mains shielding
- Regen terminals

Please see the VLT® High Power Drive Selection Guide for the complete range of options.

Danfoss VLT Drives, Ulsnaes 1, DK-6300 Graasten, Denmark, Tel. +45 74 88 22 22, Fax +45 74 65 25 80  
www.danfoss.com/drives, E-mail: info@danfoss.com

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 consequential 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.