



**VLT® | VAGON®**

**FC 280 MIDI DRIVE**

Product Overview



# ABOUT US

Established in 1974 as a single bearing shop in Durban, South Africa; BMG's aggressive growth strategy has included acquisitions, supplemented by a steady organic growth discipline. BMG attracts best-of-breed talent resulting in technical expertise that differentiates BMG in the industry. Staff are truly part of the BMG family and its success.

BMG boasts an accredited in-house technical and commercial training academy which fosters a culture of staff development and career advancement; it's all about sustainability.

The net result, is a company that reliably supplies and supports 70 000 customers in 15 countries with the widest range of industrial engineered products and expert services in Africa via 105 branches.

BMG is positioned to deliver bespoke 360 degree solutions to its customers, and subsequently return on investment to its investors and shareholders. BMG plays a pivotal role in supporting the productivity and production targets of all Industrial, Manufacturing, Mining and Agricultural sectors of the economies in the countries it serves. With an enviable reputation as Africa's largest distributor, manufacturer and service provider of the highest quality engineering consumables and components; including

- Bearings & Seals
- Power Transmission Components
- Drives, Motors and Controllers
- Hydraulics, Pneumatics and Filtration
- Heavy and Light Duty Materials Handling
- Valves and Lubrication
- Fasteners, Gaskets and Tools

BMG is a level 4 BEE contributor with ISO 9001 Quality Assurance certification. Health and safety of its employees and customers is a paramount focus and the company adheres to ISO 45001. BMG is also committed to environmental care and sustainability and strictly follows the ISO 14001 charter.

As a key contributor to the Invicta Holdings stable, BMG has played a major part in Invicta's unique achievement of being rated in South Africa's Top 100 Companies for 21 consecutive years.



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# OVERVIEW

Reach new levels of performance with the VLT® Midi Drive FC 280, an evolution of the popular VLT® 2800 drive. Profit from new savings, with a wide range of features designed to make installing, using and maintaining the AC drive as simple and as easy as possible. Just set it and forget about it.

The VLT® Midi drive is ideal for precise and efficient motor control for machine builders in the food and beverage, materials handling and processing industries. It is effective on control performance, functional safety and flexible fieldbus communication.

The right mix of features ensures that the AC drive suits your task, whether for conveyor systems, mixers and packaging systems or driving pumps, fans and compressors.

With all-pluggable connectors, integrated harmonics mitigation, RFI filter and dual-channel STO functional safety, the drive is easy to use and with no hidden extras.

## The VLT® Midi Drive Provides

- Easy, fast installation & set-up
- Cost & space savings
- Flexibility to suit your task, giving you the freedom to achieve your system goals.

## Set & Forget

Built on the success and experience of more than 45 years in the drives field, the VLT® Midi Drive shares the same technical heritage represented by the VLT® name in AC drives.

Therefore you can rely on the same low-maintenance robustness and reliability. Once you have set it, it will run reliably, earning you energy savings for years to come.

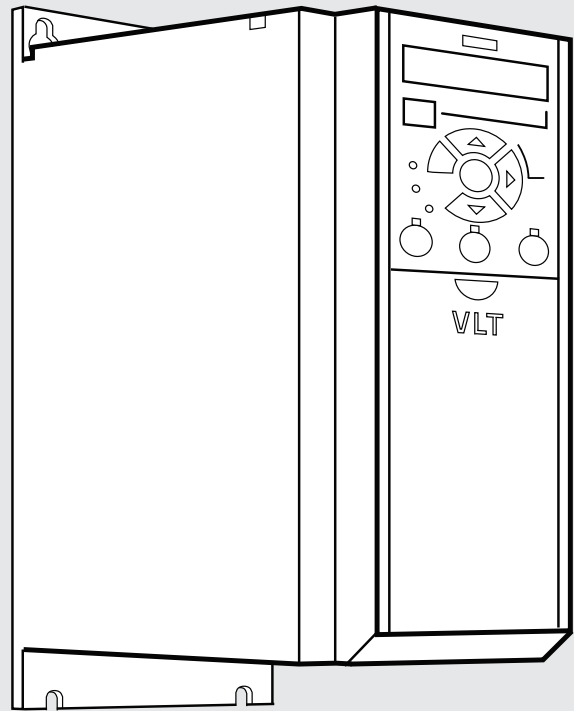
## Freedom from Extra Components

- The integrated DC choke for the 3-phase units and active power factor correction (PFC) for the single-phase unit means that you can achieve harmonic mitigation with no additional component costs or space requirements.
- The built-in RFI disconnect switch minimizes current leakage and optimizes safe operation on the IT mains as a standard.
- The VLT® Midi Drive is designed to operate at 45°C ambient temperature at its full load and 55°C with derating. There is no need to install extra cooling equipment or oversize the drive, due to this capacity.

These integrated features translate into cost savings for your project.

## Compact Design for Easy Installation

The compact design, side by side and horizontal mounting with zero clearance between the drives, makes it simpler to optimize the panel space.



## Easy Retrofit

The VLT® Midi Drive is designed to be compatible with the VLT® 2800. Its exterior dimensions, connectors, cable lengths and set-up software tools, allow for the retrofitting of an established drive panel.

## Service Friendly

The integrated USB port, as well as the VLT® Memory Module, are features that include factory settings for OEM and machine builders, fast installation of firmware updates and easy commissioning of drives. A first for VLT® drives.

To transfer pre-defined parameters, create a back-up copy, or commission the drive online, simply connect the FC 280 to a PC using the handy front-access USB port. Alternatively, connect via the fieldbus. Drives can be cloned by using the VLT® Memory Module or by using the settings on the LCP copy function.

Save time on the set-up of numeric or graphical LCP. Easy parameters set-up, make the path to energy-saving via an enhanced numeric LCP or graphical control panel that supports seven languages, both quick and easy. Targeted 'Application Selections' make it easy for users to set up and select typical applications.

## VLT® Motion Control Tool MCT 10

Configure and monitor the FC 280 with Danfoss' own VLT® Motion Control Tool, MCT 10. This tool provides plant managers with a comprehensive overview of the system at any point in time and a high level of flexibility in configuration and monitoring. It has a USB port, enabling fast PC connection for commissioning and troubleshooting.

## All-Pluggable

Pluggable terminals make this the simplest wiring task imaginable for installation and service. A simple plugin and plug out for mains, I/O, Fieldbus and motor connections.



The integrated USB port and the VLT® Memory Module facilitate the effective implementation of factory settings, the fast installation of firmware updates and the easy transfer of settings.

# FEATURES & BENEFITS

Features	Benefits
<b>Integrated Harmonics &amp; EMC Design</b>	
Integrated DC Choke or Active Power Factor Correction (PFC)	<ul style="list-style-type: none"> <li>Reduces Installation Time &amp; Panel Space Requirements</li> <li>Improves Power Supply Quality</li> <li>Reduces the Effective Input Current/VA Rating</li> </ul>
Integrated EMC Filter	<ul style="list-style-type: none"> <li>Avoids Malfunction &amp; Improves Reliability of Surrounding Components</li> <li>Reduces Installation Time &amp; Panel Space Requirements</li> <li>Proven compliance to Cat. C2/EN 61800-3 (Class A1/EN 55011)</li> </ul>
RFI Switch	<ul style="list-style-type: none"> <li>Operates Safely on IT Mains</li> </ul>
<b>Easy Installation &amp; Set-up</b>	
Pluggable Terminals	<ul style="list-style-type: none"> <li>Fast Installation &amp; Unit Exchange</li> </ul>
USB Port	<ul style="list-style-type: none"> <li>Easy PC Connection for Troubleshooting or Commissioning</li> <li>No Need for Adapter or PC-USB Driver</li> </ul>
Application Set-up Wizards	<ul style="list-style-type: none"> <li>Easy Commissioning</li> </ul>
Enhanced Numerical LCP (Optional)	<ul style="list-style-type: none"> <li>Cost Effective User Interface</li> </ul>
Graphical LCP Supporting Various Languages, Including an Adapter (Optional)	<ul style="list-style-type: none"> <li>Easy Set-up in one of Seven Main Languages</li> <li>Troubleshooting is Quick &amp; Easy.</li> </ul>
Memory Module (Optional)	<ul style="list-style-type: none"> <li>The Convenient Transfer of Parameter Set-up</li> <li>Easy Firmware Updates</li> <li>Easy &amp; Fast Commissioning</li> </ul>
Memory Module Reader (Optional)	<ul style="list-style-type: none"> <li>Convenient Transfer files to &amp; from the VLT® Memory Module MCM 102 via the PC</li> </ul>
<b>Strategic Design for Applications, Safety &amp; Motor Control</b>	
Integrated Safe Torque Off (STO), Dual Channel	<ul style="list-style-type: none"> <li>Eliminates External Components</li> <li>Enables Reliable Functional Safety</li> </ul>
The Control Algorithm Runs Both Induction & PM Motors	<ul style="list-style-type: none"> <li>Freedom to choose the best high-efficiency motor for the task</li> </ul>
Integrated Brake Chopper for 3-phase Drives in all Power Sizes up to 22 kW	<ul style="list-style-type: none"> <li>No additional Cost for External Braking Chopper</li> </ul>
Side-by-side or Horizontal Mounting, without Derating & Clearance	<ul style="list-style-type: none"> <li>Allows for Flexible Mounting &amp; Saves Cabinet Space &amp; Cost</li> </ul>
Operates at up to 45°C without Derating & Clearance	<ul style="list-style-type: none"> <li>Saves on Cost for External Cooling &amp; Reduces Downtime for Overtemperature Failures</li> </ul>



# ADAPTS TO YOUR APPLICATION

Ease of use and high flexibility in the Food and Beverage, Materials Handling and Processing industries. The right mix of features is the key to optimizing performance for:

## Conveyor Systems

Relieve the conveyor from mechanical stress via controlled acceleration and deceleration, promoting longer life and lower operating costs.

## Mixers

Upgrade from VLT® 2800, free of redesign as the VLT® Midi Drive fits perfectly. Upgrade to the high efficiency motor of your choice (the VLT® Midi Drive is compatible).

## Packaging Systems

Profit from this all-in-one concept and compact size, industrial Fieldbus support, integrated functional safety and positioning features.

## Pumps

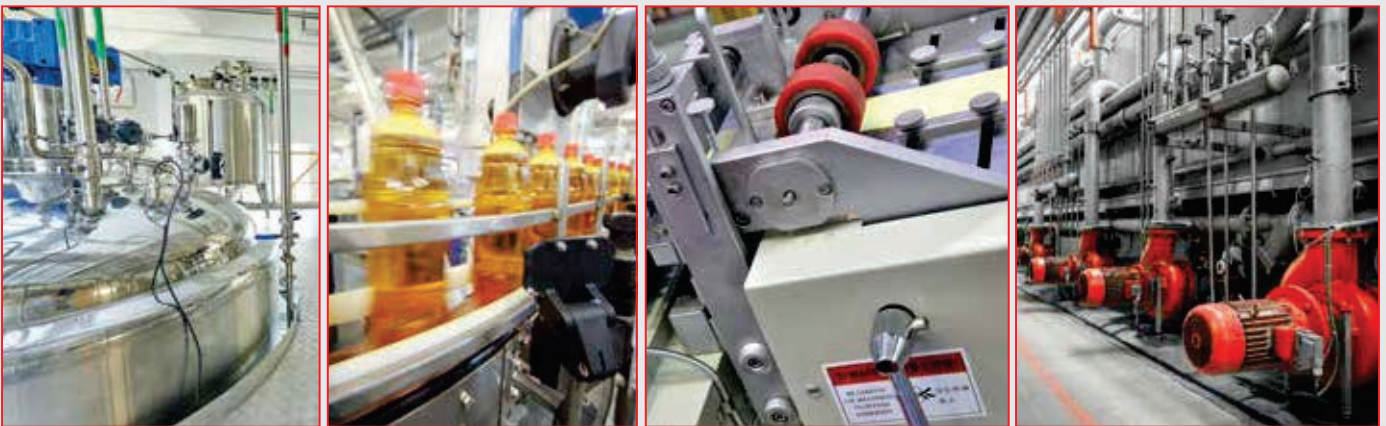
Integrated PID controls provide solid process control of the pump complete with an energy saving sleep mode.

## Fans

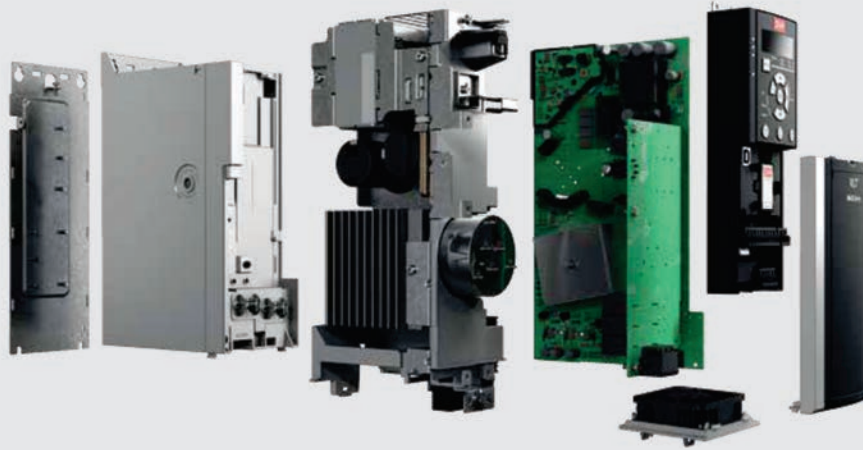
Achieve up to 50% energy savings with a 20% reduction in fan speed and save on carbon emissions.

## Compressors

Enjoy built-in functional safety and the Fieldbus protocol of your choice, whilst optimizing co-efficient performance .



A broad range of Fieldbus options suit protocol standards for various industries. The international certification includes CE and UL. Choose the best high-efficiency motor for your task, as these drives are compatible with both induction and PM Motors.



## Integrated Harmonic Mitigation

In compliance with IEC/EN 61000-3-2/61000-3-12, the integrated DC chokes for all 3-phase units, reduce the harmonics to less than 48% THDi. For the single-phase units, the harmonics are less than 8% due to the integrated active PFC.

## Integrated Brake Chopper

The built-in brake chopper on the 3-phase drives range, saves money and panel space.

## Pulse Input as Speed Reference

The FC 280 offers the capability to convert pulse input as a speed reference, avoiding the need to purchase an analog signal module for the PLC.

## Integrated PID Controller

The built-in PID controller ensures solid process control, such as constant pressure or constant flow operation.

## Integrated RFI Filter

Built-in filters not only save space, but also eliminate extra fitting, wiring and material costs. The integrated RFI filter improves the quality of the power supply, avoiding malfunctioning and improving the reliability of the surrounding components.

## Integrated Positioning Control

With the integrated encoder input, the positioning control includes features such as homing, a position reference setting, position feedback and PID control. It supports both absolute positioning and relative positioning applications such as palletizers or line conveyors.

## Coated PCBs

The printed circuit boards (PCB) are coated as a standard according to the 3C3 (IEC 60721-3-3) classification against corrosive gases. This protection provides high reliability in harsh environments, preventing failures and unnecessary downtime while increasing the lifespan of the drive.

## Reliable Back-up Concept

An external 24 V back-up option for power supply, to keep Fieldbus communication on while it is disconnected from the mains.



## Communicative

### Easy Connectivity

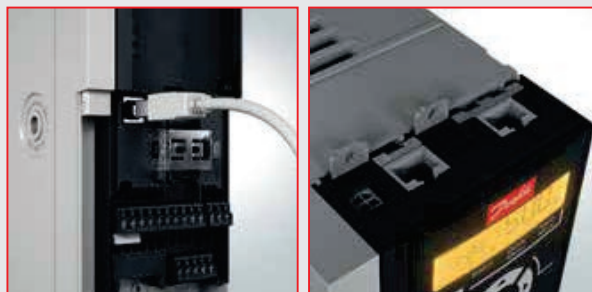
Use the integrated USB port for convenient PC connection during commissioning or service.

### Your Choice of Fieldbus

Communicate using your choice of Process Automation

Protocols:

- PROFINET with a Dual Port
- POWERLINK with a Dual Port
- EtherNet/IP™ with a Dual Port
- PROFIBUS
- CANopen
- Modbus RTU and FC Protocol are integrated as standard



## Adaptive

### PM Motor Compatibility

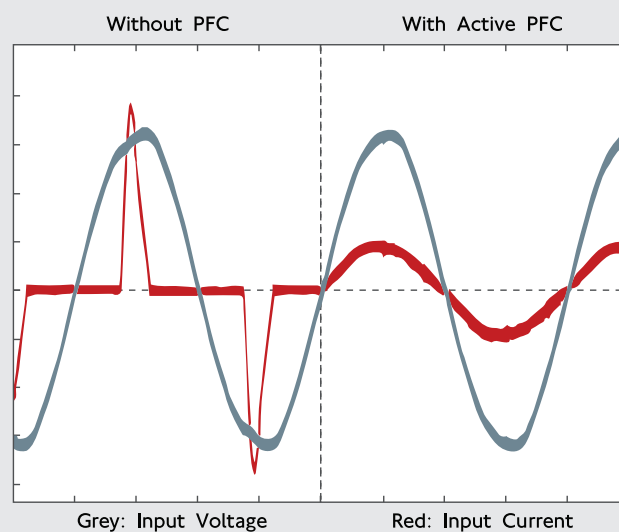
Choose the best high-efficiency motor for your application. The VLT® Midi Drive provides highly efficient permanent magnet (PM) motor control in an open loop under V VC+ in the entire power range.

## Clean

### Active Power Factor Correction

Comes standard in all single-phase units. The unique active power factor correction feature reduces the input current distortion to less than 8% and it ensures safe compliance to the IEC/EN 61000-3-2 standard. This leads to:

- Reduced VA ratings of utility equipment such as cabling, fuses and switches.
- Enables the grouping of more devices on a single phase supply branch.
- Reduced consumption of effective current, and lower harmonic load on the power supply mains network, transformer and connected devices.

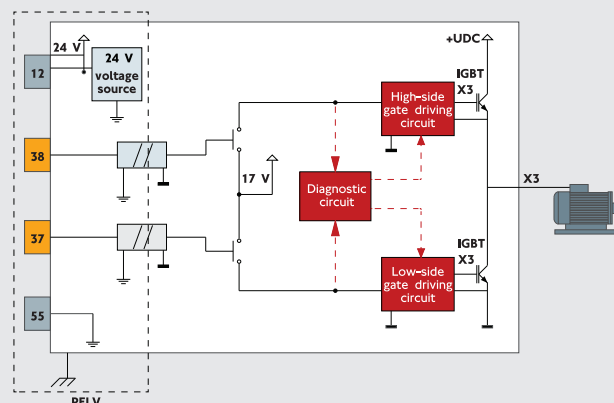


## Safe

### Dual-channel Safe Torque-off

The Safe Torque-off (STO) function is a component in a safety control system. STO prevents the unit from generating the energy that is required to rotate the motor, which ensures safe conditions in emergency situations. The dual-channel STO function in the VLT® Midi Drive is designed and approved for the requirements of:

- IEC/EN 61508: 2010 SIL 2
- IEC/EN 61800-5-2: 2007 SIL2
- IEC/EN 62061: 2005 SILCL of SIL2
- EN ISO 13849-1: 2008 Category 3 PL d



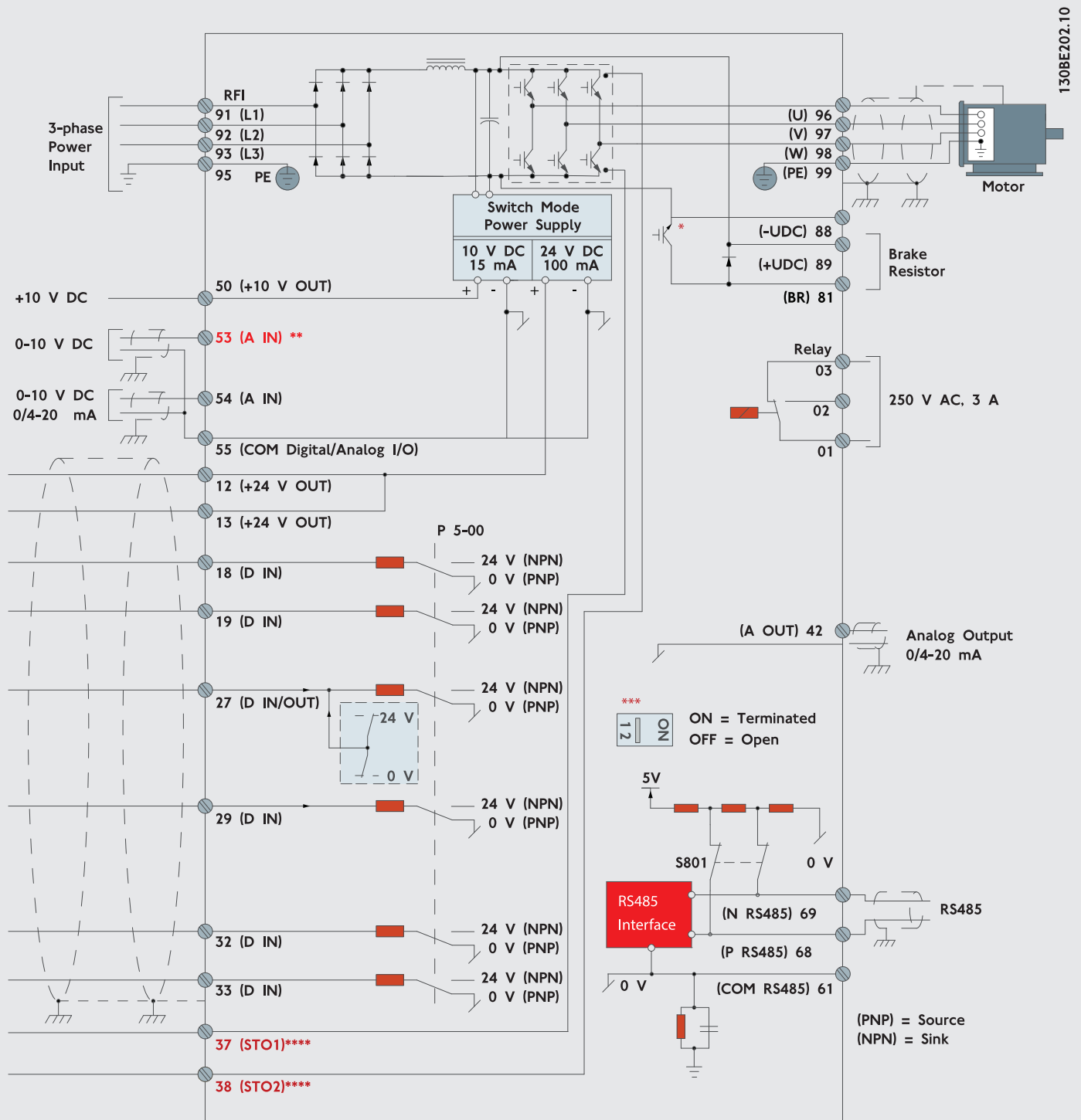
# SPECIFICATIONS

Mains Supply (L1, L2, L3)	
Supply Voltage	200-240 V (-15%/+10%) 380-480 V (-15%/+10%)
Supply Frequency	50/60 Hz
Displacement Power Factor (cos $\phi$ )	Near Unity (> 0.98)
Switching Frequency on the Input Supply L1, L2, L3	Switching Maximum 2 Times/Minute
Output Data (U, V, W)	
Output Voltage	0-100% of supply voltage
Switching on Output	Unlimited
Ramp Times	0.01-3600 s
Frequency Range	0-500 Hz
Programmable Digital Inputs & Outputs	
Digital Inputs/Digital Outputs*	6 (7) / 1
Logic	PNP or NPN
Voltage Level	0-24 V DC

\*One of 6 digital inputs can be configured as the digital output or pulse output. One of the analog inputs can be configured as an extra digital input, thereby bringing the quantity of digital inputs to 7.

Pulse & Encoder Inputs	
Pulse Inputs/Encoder Inputs**	2/2
Voltage Level	0-24 V DC
<b>**NOTE:</b> Two digital inputs can be configured as the pulse inputs. One pair can be configured as the encoder inputs.	
Programmable Analog Inputs	
Analog Inputs	2
Modes	1 voltage or current / 1 voltage or DI
Voltage Level	0 V to +10 V (scaleable)
Current Level	0/4 to 20 mA (scaleable)
Programmable Analog Outputs	
Analog Outputs	1
Current Range at Analog Output	0/4 to 20 mA
Programmable Relay Outputs	
Relay Outputs	1
Approvals	
Approvals	CE, UL Listed, cUL, T $\phi$ V, RCM (C-Tick), EAC





**A = Analog, D = Digital**

\* Built-in Brake Chopper is only available on 3-phase Units.

\*\* Terminal 53 can also be used as a digital input.

\*\*\* Switch S801 (Bus Terminal) can be used to enable termination on the Rs485 port (terminals 68 and 69).

\*\*\*\* Refer to the operating instructions 'Safe Torque Off (STO)' on page 6 for the correct STO wiring.

# ELECTRICAL DATA

## VLT® Midi Drive FC 280 3 x 380-480 V AC

Enclosure IP20		K1						K2
		PK37	PK55	PK75	P1K1	P1K5	P2K2	P3K0
Typical Shaft Output	[kW]	0.37	0.55	0.75	1.1	1.5	2.2	3
Output Current								
Continuous (3 x 380-440 V)	[A]	1.2	1.7	2.2	3	3.7	5.3	7.2
Continuous (3 x 441-480 V)	[A]	1.1	1.6	2.1	2.8	3.4	4.8	6.3
Intermittent (60s Overload)	[A]	1.9	2.7	3.5	4.8	6.0	8.5	11.5
Output Power								
Continuous (400 V AC)	[kVA]	0.8	1.2	1.5	2.1	2.6	3.7	5.0
Continuous (480 V AC)	[kVA]	0.9	1.3	1.7	2.5	2.8	4.0	5.2
Maximum Input Current								
Continuous (3 x 380-440 V)	[A]	1.2	1.6	2.1	2.6	3.5	4.7	6.3
Continuous (3 x 441-480 V)	[A]	1.0	1.2	1.8	2.0	2.9	3.9	4.3
Intermittent (60s Overload)	[A]	1.9	2.6	3.4	4.2	5.6	7.5	10.1
Additional Specifications								
Maximum Cable Cross-Section Mains, Motor, Brake & Load Sharing	[mm <sup>2</sup> ] (AWG)	4 (12)						
Estimated Power Loss at Rated Maximum Load <sup>1)</sup>	[W]	20.9	25.2	30.01	40.01	53	74.0	94.8
Efficiency <sup>2)</sup>	[%]	96.2	97.0	97.2	97.4	97.4	97.6	97.5

Enclosure IP20		K2		K3	K4		K5		
		P4K0	P5K5	P7K5	P11K	P15K	P18K	P22K	
Typical Shaft Output	[kW]	4	5.5	7.5	11	15	18.5	22	
Output Current									
Continuous (3 x 380-440 V)	[A]	9	12	15.5	23	31	37	42.5	
Continuous (3 x 441-480 V)	[A]	8.2	11	14	21	27	34	40	
Intermittent (60s Overload)	[A]	14.4	19.2	24.8	34.5	46.5	55.5	63.8	
Output Power									
Continuous (400 V AC)	[kVA]	6.2	8.3	10.7	15.9	21.5	25.6	29.5	
Continuous (480 V AC)	[kVA]	6.8	9.1	11.6	17.5	22.4	28.3	33.3	
Maximum Input Current									
Continuous (3 x 380-440 V)	[A]	8.3	11.2	15.1	22.1	29.9	35.2	41.5	
Continuous (3 x 441-480 V)	[A]	6.8	9.4	12.6	18.4	24.7	29.3	34.6	
Intermittent (60s Overload)	[A]	13.3	17.9	24.2	33.2	44.9	52.8	62.3	
Additional Specifications									
Maximum Cable Cross-Section Mains, Motor, Brake & Load Sharing	[mm <sup>2</sup> ] (AWG)	4 (12)			16 (6)				
Estimated Power Loss at Rated Maximum Load <sup>1)</sup>	[W]	115.5	157.5	192.8	289.5	393.4	402.8	467.5	
Efficiency <sup>2)</sup>	[%]	97.6	97.7	98.0	97.8	97.8	98.1	97.9	

## VLT® Midi Drive FC 280 3 x 200-240 V AC

Enclosure IP20		K1					K2	K3
		PK37	PK55	PK75	P1K1	P1K5	P2K2	P3K7
Typical Shaft Output	[kW]	0.37	0.55	0.75	1.1	1.5	2.2	3.7
Output Current								
Continuous (3 x 200-240 V)	[A]	2.2	3.2	4.2	6	6.8	9.6	15.2
Intermittent (60s Overload)	[A]	3.5	5.1	6.7	9.6	10.9	15.4	24.3
Output Power								
Continuous (230 V AC)	[kVA]	0.9	1.3	1.7	2.4	2.7	3.8	6.1
Maximum Input Current								
Continuous (3 x 200-240 V)	[A]	1.8	2.7	3.4	4.7	6.3	8.8	14.3
Intermittent (60s Overload)	[A]	2.9	4.3	5.4	7.5	10.1	14.1	22.9
Additional Specifications								
Maximum Cable Cross-Section Mains, Motor & Brake	[mm <sup>2</sup> ] (AWG)	4 (12)						
Estimated Power Loss at Rated Maximum Load <sup>1)</sup>	[W]	29.4	38.5	51.1	60.7	76.1	96.1	147.5
Efficiency <sup>2)</sup>	[%]	96.4	96.6	96.3	96.6	96.5	96.7	96.7

## VLT® Midi Drive FC 280 1 x 200-240 V AC

Enclosure IP20		K1					K2
		PK37	PK55	PK75	P1K1	P1K5	P2K2
Typical Shaft Output	[kW]	0.37	0.55	0.75	1.1	1.5	2.2
Output Current							
Continuous (3 x 200-240 V)	[A]	2.2	3.2	4.2	6	6.8	9.6
Intermittent (60s Overload)	[A]	3.5	5.1	6.7	9.6	10.9	15.4
Output Power							
Continuous (230 V AC)	[kVA]	0.9	1.3	1.7	2.4	2.7	3.8
Maximum Input Current							
Continuous (1 x 200-240 V)	[A]	2.9	4.4	5.5	7.7	10.4	14.4
Intermittent (60s Overload)	[A]	4.6	7.0	8.8	12.3	16.6	23.0
Additional Specifications							
Maximum Cable Cross-Section Mains, Motor & Brake	[mm <sup>2</sup> ] (AWG)	4 (12)					
Estimated Power Loss at Rated Maximum Load <sup>1)</sup>	[W]	37.7	46.2	56.2	76.8	97.5	121.6
Efficiency <sup>2)</sup>	[%]	94.4	95.1	95.1	95.3	95.0	95.4

[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14]

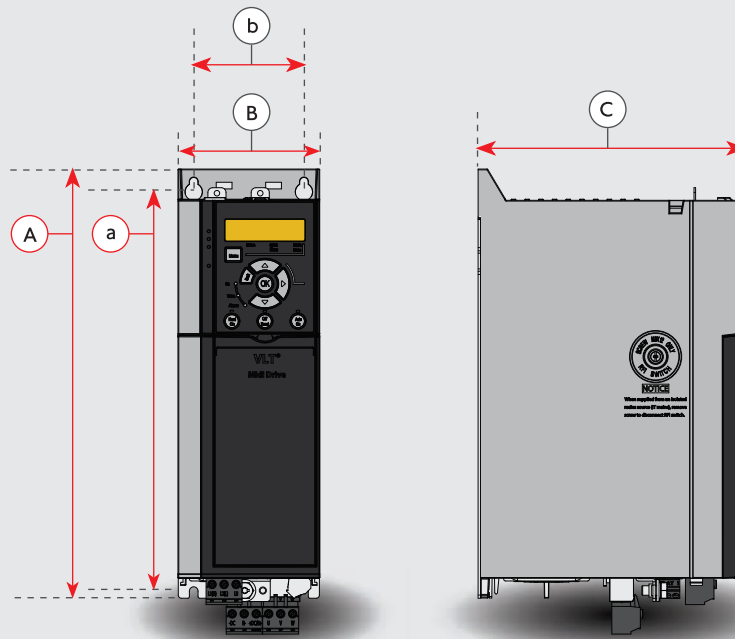
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[1] Application (Character 4-6)	
280	VLT® Midi Drive FC 280
[2] Power Size (Character 7-10)	
PK37	0.37 kW / 0.50 HP
PK55	0.55 kW / 0.75 HP
PK75	0.75 kW / 1.0 HP
P1K1	1.1 kW / 1.5 HP
P1K5	1.5 kW / 2.0 HP
P2K2	2.2 kW / 3.0 HP
P3K0	3.0 kW / 4.0 HP
P3K7	3.7 kW / 5.0 HP
P4K0	4.0 kW / 5.5 HP
P5K5	5.5 kW / 7.5 HP
P7K5	7.5 kW / 10 HP
P11K	11 kW / 15 HP
P15K	15 kW / 20 HP
P18K	18.5 kW / 25 HP
P22K	22 kW / 30 HP

[3] AC Line Voltage (Character 11-12)	
S2	1 x 200/240 V AC
T2	3 x 200/240 V AC
T4	3 x 380/480 V AC
[4] Enclosure (Character 13-15)	
E20	IP20/Chassis
[5] RFI Filter, Terminal & Monitoring Options - EN/IEC 61800-3 (Character 16-17)	
H1	RFI-Filter Class: Single-phase A1/B (C1) 3-phase A1 (C2)
H2	RFI-Filter, Class A2 (C3)
[6] Braking (Character 18)	
X	No brake IGBT (S2 only)
B	Brake IGBT
[7] LCP Display (Character 19)	
X	No LCP installed
[8] PCB Coating - IEC 721-3-3 (Character 20)	
C	Coated PCB Class 3C3

[9] Mains Input (Character 21)	
X	No Mains Option
[10] Hardware Option A (Character 22)	
X	Standard Cable Entries
[11] Hardware Option B (Character 23)	
X	No Adaptation
[12] Special Version (Character 24-27)	
SXXX	Latest Released Standard Software
[13] LCP Language (Character 28)	
X	English, German, French, Spanish, Danish, Italian, Brazilian-Portuguese
Contact the factory for other language options	
[14] Integrated Fieldbus (Character 29-30)	
AX	Modbus RTU
A0	PROFIBUS DP
A6	CANopen
AL	PROFINET
AN	EtherNet/IP™
AY	POWERLINK

Please be aware that not all combinations are possible. Get help to configure your AC drive using the online configurator at: [driveconfig.danfoss.com](http://driveconfig.danfoss.com)



## Dimensions & Weights

Enclosure IP20		K1							K2			K3		K4		K5					
Power Size [kW]	Single-phase 200-240 V	0.37	0.55	0.75	1.1	1.5			2.2												
	3-phase 200-240 V	0.37	0.55	0.75	1.1	1.5			2.2		3.7										
	3-phase 380-480 V	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22						
Dimensions [mm]	Height A	210							272.5			272.5		320		410					
	Width B	75							90			115		135		150					
	Depth C	168							168			168		245		245					
Mounting Holes	a	198							260			260		297.5		390					
	b	60							70			90		105		120					
Weight [kg]	IP20	2.3					2.5		3.6			4.1		9.4		9.5		12.3		12.5	



## Fieldbus

PROFINET with Dual Port
POWERLINK with Dual Port
EtherNet/IP with Dual Port
PROFIBUS DP V1
CANopen

Available for the entire product range

## Profinet

PROFINET uniquely combines the highest performance with the highest degree of openness. The PROFINET variant gives the user access to the power of Ethernet. It is designed so that many of the features from the PROFIBUS can be reused, minimizing the user effort to migrate PROFINET, and securing the investment in the PLC program.

### Other Features:

Support from the DP-V1 Diagnostic allows for easy, fast and standardized handling of the warning and fault information into the PLC, improving system bandwidth.

PROFINET encompasses a suite of messages and services for a variety of manufacturing automation applications.

## Powerlink

POWERLINK represents the second generation of the fieldbus. The high bit rate of the industrial Ethernet can now be used to make the IT technologies used in the automation world available for the factory world. POWERLINK provides high performance real-time and time synchronisation features.

Its CANopen-based communication model, network management and device description model offers much more than just a fast communication network.

### POWERLINK Provides:

- A built-in, high performance switch enabling line-topology, eliminates the need for external switches.
- The perfect solution for materials handling applications.

## EtherNet/IP™

Ethernet is the standard for communication on the factory floor. EtherNet/IP™ is based on the newest technology available for industrial use and handles even the most demanding requirements. EtherNet/IP™ extends commercial off-the-shelf Ethernet to the Common Industrial Protocol (CIP™). The same upper-layer protocol and object model found in DeviceNet.

Advanced features:

- Advanced switch and diagnostic functions.
- Unicast and Multicast communication.

## PROFIBUS DP

Operating the AC drive via a Fieldbus, enables you to reduce the cost of your system, communicate faster and more efficiently, therefore benefitting from an easier user interface. PROFIBUS DP provides:

- Wide compatibility, a high level of availability, support for major PLC vendors, and compatible with future versions.
- Fast and efficient communication, transparent installation, advanced diagnostics, parameterization and auto-configuration of process data via GSD-file.
- Acyclic parameterization using PROFIBUS DP-V1, PROFIdrive or Danfoss FC profile state machines, PROFIBUS DP-V1, Master Class 1 and 2.

## CANopen

High flexibility and low costs are two of the “cornerstones” for CANopen. The CANopen variant is fully equipped with both high priority access to control and status of the AC drive (PDO Communication) and access to all parameters through acyclic data (SDO Communication). An interoperability option was implemented on the DSP402 AC drive profile. This all guarantees standardized handling, interoperability and low cost.

## Modbus RTU

The Modbus RTU protocol is based on the integrated RS485 (EIA-485) interface on the control card. RS485 is a two-wire bus-interface that allows multi-drop network topology. Danfoss uses the two-wire system where the communication between master and slave is half-duplex, meaning it cannot transmit and receive at the same time.

According to the EIA-485 specification:

- A total of 32 nodes can be connected to one Modbus RTU network segment.
- A total of 247 nodes are supported in a network.
- Network segments are divided with repeaters.

# ACCESSORIES



## LCP

VLT® Control Panel LCP 21 (Numeric) Ordering Number: 132B0254

VLT® Control Panel LCP Blind Cover Ordering Number: 132B0262

VLT® Control Panel LCP 102 (Graphical) Ordering Number: 130B1107

LCP Panel Mounting Kit Ordering Number for IP20 Enclosure

130B1117: (Graphical) with Fasteners, Gasket and without LCP and with 3 m cable  
 132B0102: (Numerical) with Fasteners, Gasket and without LCP and with 3 m cable

Graphical LCP Adapter  
 Ordering Number: 132B0281

## Power Options\*

VLT® Sine-Wave Filter MCC 101

VLT® dU/dt Filter MCC 102

VLT® Brake Resistors MCE 101

VLT® EMC Filters MCC 107

## Accessories

IP21 / Type 1 Conversion Kit Ordering Number:

- 132B0335: K1
- 132B0336: K2
- 132B0337: K3
- 132B0338: K4
- 132B0339: K5

Mounting Adapter Ordering Number:

- 132B0363: Adapter Plate, VLT® 2800 Size A
- 132B0364: Adapter Plate, VLT® 2800 Size B
- 132B0365: Adapter Plate, VLT® 2800 Size C
- 132B0366: Adapter Plate, VLT® 2800 Size D

VLT® Memory Module MCM 102 Ordering Number: 132B0359

VLT® 24 V DC Supply MCB 106 Ordering Number: 132B0368

\*Ordering Number: See the relevant Design Guide

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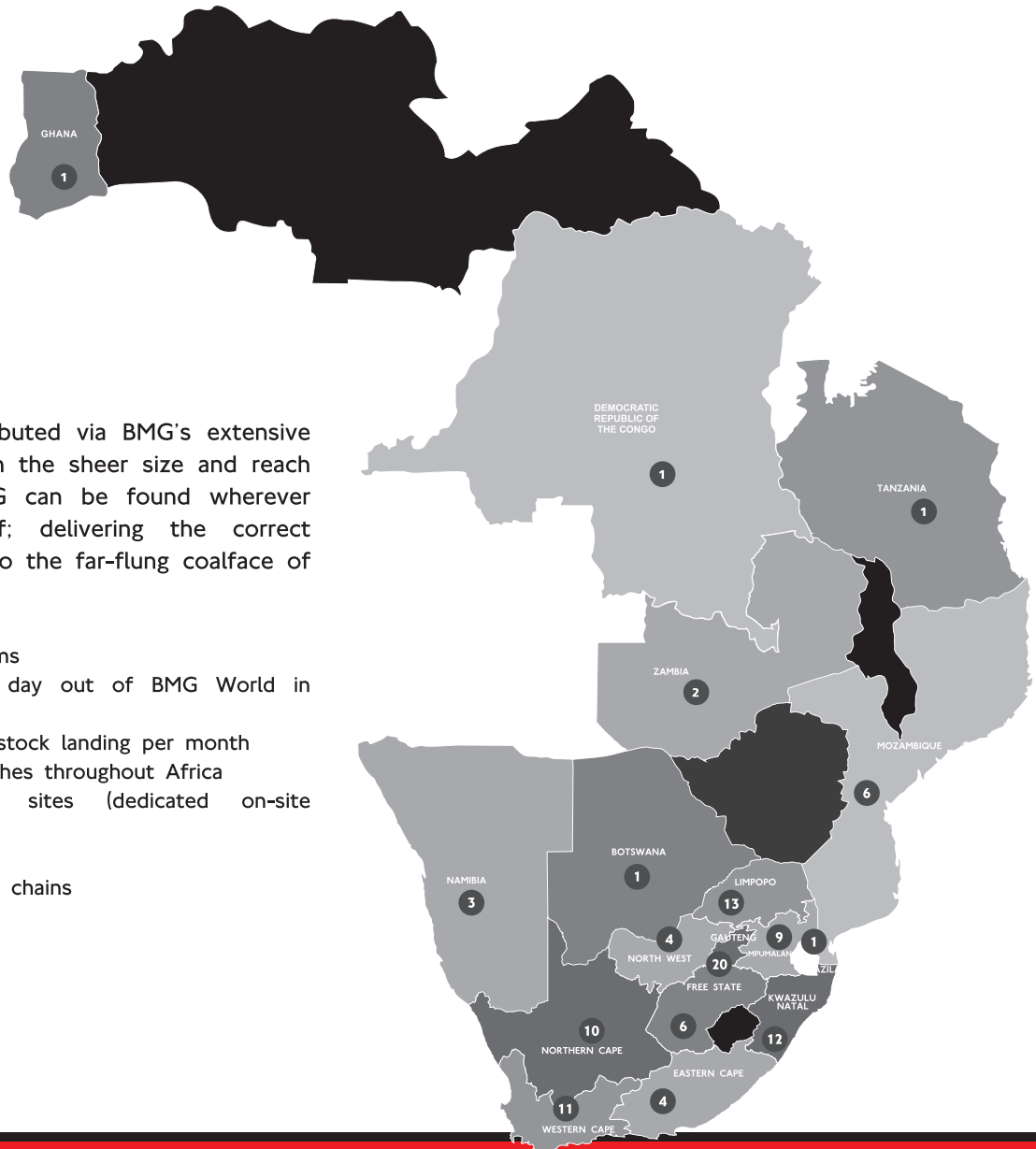
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