



VLT® | VAGON®

AC DRIVES FOR MINING & MINERAL PROCESSING

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.

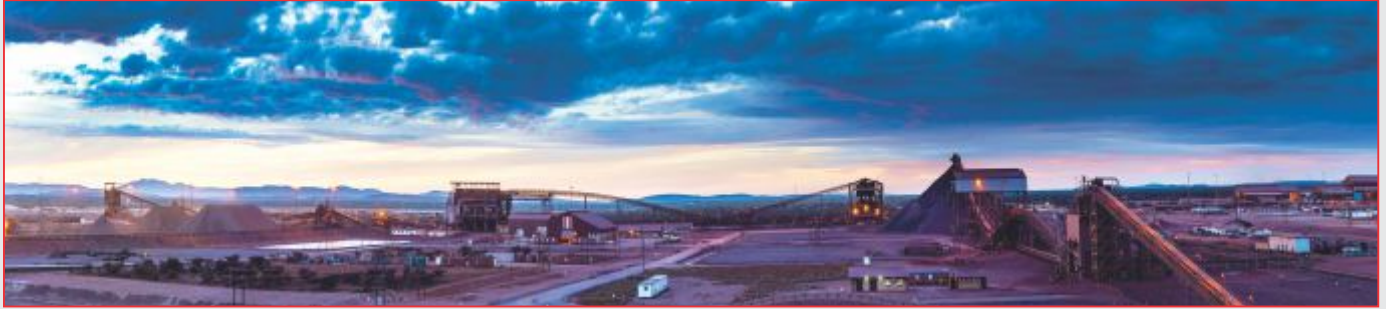


TABLE OF CONTENTS

INDEX

VLT® & VACON® Overview	1-2
Mine & Mineral Processing Environments	3-6
Products	7
VLT® Drives	8-9
VACON® Drives	10-11
Harmonics Calculation Software	12-13
Motor Independence	14





No matter how well optimised your plant design is, there are always ways to drive cost down more. AC drives are used extensively for prolonging equipment life, to optimize processes, reducing maintenance and for saving energy costs. The mining and mineral industries present some of the most challenging production environments. Mines, mineral processing facilities, associated stockyards and port facilities are on larger scales and are often in remote locations.

The Benefit of an Experienced Partner

Contact us for a partner who understands your issues and who can give you the winning edge.

We ensure the optimum selection of products to fulfil all your mining and processing equipment application requirements. By optimizing AC drive applications, we can provide solutions that significantly reduce initial project and ongoing operating costs.

Whatever low voltage AC drive you require, we can deliver it, on time, no matter the location. VLT® and VACON® drives operate reliably over decades of use in harsh environments, therefore, saving maintenance costs, ensuring better asset availability and providing you with the lowest cost of ownership.

All our drives integrate seamlessly into all common PLC Fieldbus networks. VLT® and VACON® drives are fully compatible with all AC motor make and types. We guarantee drive and motor compatibility on long cable installations, regardless of which motor supplier you have chosen, and mains supply compatibility through harmonic calculations, reports and mitigation solutions.

A standard design for the long cables saves project costs initially.

The large-scale layout of mine processing plants and port facilities, often result in cable lengths between AC drives and motors being long, relative to other industries. Cable lengths are typically 50 m to 150 m, and occasionally longer.

These relatively long cable lengths can put electrical and thermal stress on the internal components of a drive if it is not designed for that purpose, resulting in unreliable operation or even failure of the AC drive.

Selecting a drive that is as a standard designed to be installed, with the length and type of cable required helps save contractor and end-user initial project cost.

Because this drive complies with international EMC standards for installations with long motor cables, you can

- Ensure long-term, reliable operation
- Minimize the risk of affecting the operation of other electrical equipment installed on-site
- Save purchase and installation costs of the external filters

Significant cost-saving opportunities, both in CAPEX and OPEX

Did you know that compact AC drives with intelligent heat management can deliver surprisingly significant savings to your site operations?

Initial CAPEX Savings Opportunities

- Switchrooms can be designed and built smaller due to compact enclosures.
- The back-channel cooling design of high power drives, results in significantly lower heat loads in switchrooms, enabling the purchase of a smaller, lower-cost air-conditioning system

Long-term OPEX Saving Opportunities

- The energy-efficient design of the VLT® and VACON® drives ensures they comply with the strict European standards defining the efficiency classes for “power drive systems and motor starters”, EN 50598-2. Both are classified as IE2. When you use the VLT® and VACON® drives to control your equipment, you are using AC drives that meet the highest benchmark for efficiency, minimizing losses and lowering operating costs.
- Use of a smaller air-conditioning system results in lower operating costs.



Local Service

Danfoss drives are backed-up by our local service and support teams, manned by dedicated drive specialists with proven mine site application and installation experience. The DrivePro® range caters for your every need. Wherever you are, you can rely on us. We are never far away, however remote your site we are a reliable company you can trust to deliver.

How we add value

Get the most out of our Drive applications and engineering support, to optimize your mining project right from the initial feasibility study stage through to the detailed design, execution and operation stages. On many mining projects across the world, this support has helped mining companies, consultants; engineering service providers and contractors design robust, reliable, energy-efficient drive solutions. These have resulted in significant initial project cost and ongoing operating cost savings.

Reap the benefits of our specialized support services, based on decades of extensive experience. Our design skills include ensuring:

- Drives and motor compatibility on long cable installations, regardless of the preferred motor supplier.
- The mains supply is compatible through harmonic calculations, reports and mitigation solutions

Mining companies around the globe have reduced costs and improved reliability.

No matter what your needs are, we will meet them.

For mining applications, BMG delivers the full package of proven experience, local availability and unmatched product quality.

Gain from our proven expertise in AC-drive technologies for mining applications. VLT® and VACON® drives have been installed and are operating reliably on mines, stockyards, bulk materials handling facilities, processing plants and related port facilities. Our experience will optimize your drive design.

At BMG we can supply absolutely any low voltage AC drive you need, for mines, processing plants or equipment OEMs, delivering to the industry.

We offer the full range, no matter your requirements:

- You choose whether to incorporate the drives into a Panel, Switchboard or Motor Control Center (MCC);
- install directly onto the wall or floor of your switchroom or substation;
- integrate air or liquid-cooled drive modules into your mining equipment;
- or install outdoor with suitable, but simple sheltering from the elements.
- Motor-independent drives that are compatible with various AC motor brands and types.
- Drives which are PLC-network free and easily integrate with other networks, no matter the preferred PLC.
- You can rely on our quality. The VLT® and VACON® drives are fully customized, factory assembled factory tested.

Why choose Danfoss Drives?

With our extensive range of AC drives and a wide selection of supporting options, we can meet your specific requirements. The compact enclosures and robust design with its built-in long motor cable capability, innovative heat management and mine-site-relevant features will optimize your panel, switchboard, switchroom or substation design. These features will assist with cost-saving and improve your competitive position.

Intelligent Heat Management for Significantly Lower Switchroom Costs

With the increasing usage of AC drives for efficient control of equipment on mines and the heat loads in switchrooms generated by these drives are commanding larger and more expensive air-conditioning systems. However, the unique back-channel cooling design of higher power VLT[®] drives and the availability of VACON[®] liquid-cooled drives can result in significantly reduced heat loads in switchrooms, enabling the use of smaller, lower-cost air-conditioning systems.

Reduced Heat Load in Switchrooms

If the air quality on the mine site is suitable, you can use the heatsink cooling fans with appropriate mounting and ducting to filter external air at temperatures of up to 50°C to exhaust approximately 85% of the heat loss from the VLT[®] drive. It can quickly be exhausted from the switchroom with no impact on the room's pressurization. The airconditioning system now only needs to be sized for the remaining 15% heat loss.

Compact Enclosures Reduce Project Costs

The compact size of the VLT[®] and VACON[®] drives, both designed as a standard for long motor cables without requiring additional options, often mean smaller switchrooms can be built, providing opportunities for vital cost saving. To find out how contractors and mining companies have saved significant project and operating costs through the use of these innovative design features, contact BMG

VLT[®] drives rated 90 kW and higher, incorporate an innovative back-channel cooling design. There are separate cooling paths for the power components and electronic controls which are separated by an IP54 seal. Approximately 85% of the power loss is removed through the heatsink due to the back-channel cooling, leaving 15% of the total loss to be dissipated into the switchroom. The innovation in our VLT[®] drives comes from ensuring they are separated by an IP54 seal and making it easy to duct outside air into and out of the back-channel air path.



Why choose Danfoss Drives?

High-temperature Reliability

The Danfoss VLT[®] and VACON[®] drives are designed as a standard to operate in high ambient temperature conditions without de-rating, and installed in environments containing relatively high levels of contaminants. By using an innovative internal cooling system, they ensure their internal components are efficiently cooled while minimizing the air-flow across the sensitive, small electronic components mounted on the printed circuit boards inside. This, combined with their standard design enables them to operate reliably even when long cables are installed between the drive and motor, making it the optimum choice for mine site installations.

Designed for Harsh Environments

The robust design, with the inclusion of harmonic and radio frequency interference (RFI) filters and the ability to be installed with long motor cables, are standard features for all VLT[®] and VACON[®] drives.

Harsh, dusty and extreme temperature conditions are common and often create challenges for any electronic product. Although it is common practice on modern mines to install drives in relatively clean, pressurized and air-conditioned switchrooms or substations, a drive designed for harsh environments will have a significantly longer, trouble-free lifespan. Aforementioned ensures more reliable availability and saves on maintenance costs.

Developed to meet the vast majority of mining and processing equipment application and installation requirements, with no need for tailored solutions. The reliability in arduous environments on mines is proven over many years of service.

VLT[®] and VACON[®] Drives Incorporate:

- An electronic protection coating that ensures that the drives are suitable for installation on mine site environments
- No external forced draft cooling across the internal components, for IP54/55 versions of lower power drives. External cooling air from the temperature-controlled cooling fans is blown across the external heatsink and not through the internal electronics of the drive.
- Back-channel cooling for the VLT[®] high-powered drives, reduces the contamination of the electric controls area, resulting in a longer lifespan and higher reliability. The remaining heat losses are removed from the electronics control area using door fans and, because these heat losses are relatively low, only a low volume of air needs to be blown through the electronic control area.

The long motor cable capability as a standard without the need for additional components, standard VLT[®] or VACON[®] drives provide troublefree operation, with cable lengths of up to at least 150 m for screened cables and 300 m for unscreened cables. No additional output filters are required for the drive to operate reliably with these cable lengths. This saves space, installation time and costs compared to traditional AC drive solutions.

With the built-in RFI filters, VLT[®] and VACON[®] drives comply with EMC standards, ensuring the reliable operation of all other electrical equipment on the same installation. No additional RFI filters are required on the input of the drive.

The drive being designed for long motor cable installations as a standard typically results in a more compact solution compared to AC drives that need to add options to operate reliably with long motor cables. This often results in considerable initial project cost savings as a result of being able to use smaller switchrooms.



Even for motor cables up to 150 m long, VLT[®] drives comply with EMC standards

MINE AND MINERAL PROCESSING ENVIRONMENTS



- | | |
|---|--|
| 1 Long Conveyors | 12 Tripper Car |
| 2 Stockpile Reclaim Feeders | 13 Train Loadout Conveyor |
| 3 Borehole Pumps | 14 Slurry Pumps; Process Water Feed Pumps; Dosing Pumps; Filters |
| 4 Stacker/Reclaimer | 15 Primary Ventilation Fans |
| 5 Conveyors | 16 Underground Conveyors |
| 6 Ship Loader | 17 Booster Fans |
| 7 Dewatering Pump Skids | 18 Crushers |
| 8 Thickeners (Pinion Drives, Feed, Overflow & Underflow (Slurry) Pumps) | 19 Slurry Pumps (e.g. Cyclone Feed Pumps; Transfer Pumps; Thickener Underflow Pumps); Feeders; Screens |
| 9 Ball Mills; Flotation Cells; Apron Feeders, Conveyors, Slurry Pumps (e.g. Transfer Pumps, Feed Pumps, Concentrate Pumps, Tailings Pumps); Process Water Pumps | 20 Stacker |
| 10 Train Unloader | 21 River Water Pumps |
| 11 Excavator | 22 Underground Mines; Mine Ventilation Fans; Conveyors; Pumps Winders |



Robust Mine Ventilation

Ensuring reliable ventilation of the mine is paramount for the health and safety of workers in the underground mine. Assuring particulates from diesel engines are adequately diluted. Ventilation operating costs are often a significant portion of the total electrical energy costs on-site, therefore being able to ventilate most efficiently saves significant operating costs.

AC drives are known as the most flexible, energy-efficient, low-maintenance method for controlling mine ventilation fans. They are used to control the airflow of the main ventilation fans on the surface as well as the auxiliary ventilation and booster fans underground. They can easily be integrated into Ventilation on Demand (VOD) control systems.

Both VLT[®] and VACON[®] drives incorporate several features that make them particularly suitable for mine ventilation fan applications. These ensure the reliable operation of the fan and the optimum use of energy, even in abnormal operating conditions.

Long Conveyor Capability

By controlling the acceleration and deceleration of long conveyors smoothly, reduces mechanical stress through all the drive-train components and within the conveyor belt itself. This leads to a longer lifespan on the belt and drives components, increasing asset availability and lowering maintenance and operating costs. Having the flexibility to control the speed of long conveyors can help optimize the complete system, reduce bottlenecks and maximize the efficiency of the material flow process, resulting in operating cost savings.

Maximize Belt Life

It is standard practice to install multiple motors on long conveyors where the drives need to ensure load sharing between each motor for dependable operation and to maximize belt life.

VLT[®] and VACON[®] drives include both Master-Master and Master-Follower control solutions. The selection of the control solution depends on the configuration of the conveyor drives on the conveyor system, for example, all drives installed at the head end or a drive installed at both the head and the tail ends.

They are both easy to implement and have proven to be robust and reliable solutions for long conveyors.

Bulk Handling

For downhill conveyors, where continuous regenerative braking operation is typically required, an Active Front End (AFE) drive or a regenerative drive panel solution, using a standard 6-pulse drive with a separate regenerative module, is the best solution.

VLT[®] and VACON[®] drives are used extensively on many long conveyors over 1 km in length, which are standard on bulk material applications processing plants and port facilities such as:

- Run-of-mine (ROM) Bin Feeder Conveyors
- Stockyards
- Train Loadout Conveyors
- Pipe Conveyors
- Long Overland Conveyors

Robust, Reliable AC Drives for Mining & Mineral Processing

VLT® and VACON® drives are available for all low voltage mains supplies, from fractional kW to more than 2 MW for all mining and mineral processing equipment applications. They are available as a standard in a wide range of wall-mounted and floor-standing IP and NEMA/UL-type-rated enclosures, to meet your specific installation needs and air-cooled and liquid-cooled modules for integrating into your mining equipment. The regenerative drives for regenerative applications and a wide range of harmonic mitigation products provide you with the optimum solution option that meets your requirements.

Communications Functionality

This legend indicates the communication interface and Fieldbus protocol functionality specific to each product. For more information, please refer to the individual product brochures.

Integrated	
BAC	BACnet
META	Metasys N2
MOD	Modbus RTU
TCP	Modbus TCP
BIP	BACnet/IP

Optional	
PB	PROFIBUS DP V1
PN	PROFINET
PL	Powerlink
DN	DeviceNet
CAN	CANopen
AKD	LONworks for AKD
LON	LONworks
BAC	BACnet (MSTP)
TCP	Modbus TCP
EIP	EtherNet/IP
ECAT	EtherCAT
DCP	DCP 3/4
DSP	CANopen DSP 417
BIP	BACnet/IP



The VLT® AutomationDrive FC 302, VLT® AQUA Drive FC 202 and VLT® HVAC Drive FC 102 are all built on the same modular platform, allowing for highly customized drives that are mass-produced, thoroughly tested, and delivered.

As a standard, they are designed to operate reliably with up to at least 150 m screened or 300 m unscreened cable lengths, with no need for additional output filters. They include a built-in DC-link choke harmonic filter and can be configured with built-in RFI filters, therefore providing different levels of EMC performance as required. Compliance with the most generally specified international EMC standard for mining and mineral processing facilities, IEC 61800-3 Category C3, with 150 m screened cable, is standard.

The robust design ensures that, as a standard, they are fit for installation in harsh environments as determined by IEC 60721-3-3 Class 3C2 and are available with an optional, higher grade PCB coating, making them suitable for installation in even more severe, Class 3C3, environments. With a few exceptions, all drive sizes are designed for operation at full nominal current ratings in ambient temperatures of up to 50°C (high overload) and 45°C (normal overload) without derating.

The back-channel cooling feature for power ratings ≥90 kW (high overload) and 110 kW (normal overload) has proven to save vital initial and ongoing operating costs on mining projects across the world.

Additional Harmonic Mitigation

The 12-pulse versions or low harmonic drive versions, incorporating a parallel-connected advanced active filter (AAF) in the same enclosure as the drive, are available as well as standalone AAFs for central compensation of harmonics and passive Advanced Harmonic Filters (AHF) for installation on the input of a drive.



VLT® Soft Starter MCD 500

The VLT® Soft Starter MCD 500 is the complete solution for soft starting and stopping three-phase induction motors. The integrated current transducers measure the motor current and provide important data for the optimal start and stop inclinations. A built-in bypass is available up to 961 A.

Adaptive Acceleration Control (AAC), adjusted to the respective load, ensures the best possible start and stop inclination to avoid water hammering.

Integrated monitoring functions provide comprehensive protection, including:

- Phase error detection,
- Thyristor monitoring
- Bypass contact overload

Technical Data

Input: 3 x 200-690 V

Control voltage: 24 V DC or 110-240 V AC

Power: 7.5-850 /2400* (1600A) kW

*"Inside Delta Connection"

Fieldbus

DN	PB	MOD
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Protection Rating

IP00	IP20	IP21/Type 1
■	■	
IP54/Type 12	IP55/Type 12	IP66/Type 4X

VLT® AutomationDrive FC 302

Used extensively for all mining and mineral processing equipment applications and on stockyards and bulk material handling facilities, VLT® AutomationDrive FC 302 ensures optimal operation of all equipment, including:

- Conveyors
- Feeders
- Crushers
- Mills
- Screens
- Slurry Pumps
- Flotation Cells
- Paste Thickeners
- Ship Loaders
- Stackers
- Reclaimers

The below kW ratings are based on High Overload ratings.

Power Range

3 x 200-240 V.....	0.25-37 kW
3 x 380-500 V.....	0.37-800 kW
3 x 525-600 V.....	0.75-75 kW
3 x 525-690 V.....	1.1-1200 kW

Power Range - Low Harmonic Drive

3 x 380-480 V.....	132-630 kW
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Power Range - 12-Pulse Drive

3 x 380-500 V.....	250-800 kW
3 x 525-690 V.....	250-1200 kW

Fieldbus

MOD				
DN	CAN	PB	TCP	EIP
ECAT	PN	PL		

Protection Rating

IP00	IP20	IP21/Type 1
■	■	■
IP54/Type 12	IP55/Type 12	IP66/Type 4X
■	■	■

VLT® AQUA Drive FC 202

Used on mine sites and mineral processing plants, VLT® AQUA Drive controls all types of pumps, including centrifugal pumps (with quadratic loads) and displacement and screw pumps (with constant torque load). VLT® AQUA Drive is generally used for mine de-watering pumps and borehole pump applications on mine sites. Often installed outdoors on pump skids or next to borehole pumps, with appropriate enclosures protecting the drives from the weather and shading from the sun. Pump protection functions are built-in, and the Automatic Energy Optimization function ensures the motor and the pump is operating at its best efficiency point.

The below kW ratings are based on Normal Overload ratings.

Power Range

3 x 200-240 V.....	0.25-45 kW
3 x 380-480 V.....	0.37-1000 kW
3 x 525-600 V.....	0.75-90 kW
3 x 525-690 V.....	1.1-1400 kW

Power Range - Low Harmonic Drive

3 x 380-480 V.....	160-710 kW
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Power Range - 12-Pulse Drive

3 x 380-500 V.....	315-1000 kW
3 x 525-690 V.....	450-1400 kW

Fieldbus

MOD				
PN	DN	PB	TCP	EIP

Protection Rating

IP00	IP20	IP21/Type 1
■	■	■
IP54/Type 12	IP55/Type 12	IP66/Type 4X
■	■	■

VLT® HVAC Drive FC 102

The VLT® HVAC Drive is used to control the airflow of the main ventilation fans on the surface as well as the auxiliary ventilation and booster fans underground. The VLT® HVAC Drive can easily be integrated into the Ventilation on Demand (VOD) control systems. Built-in functions ensure reliable, continued operation of the fan, even in abnormal operating conditions. The Automatic Energy Optimization (AEO) function improves the overall efficiency of the combined drive and motor at all loads and speeds, resulting in lower operating costs and the optimum use of energy. Efficiency gains of >0.5%, for the total system (switchroom + AC drive + motor + fan), are inferior compared to other "standard" AC drives. As main ventilation fans are high energy users, an improvement in the total efficiency of just 0.5% translates to significant savings on operating costs.

The below kW ratings are based on Normal Overload ratings.

Power 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.....	1.1-1400 kW

Power Range - Low Harmonic Drive

3 x 380-480 V.....	160-710 kW
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Power Range - 12-Pulse Drive

3 x 380-500 V.....	315-1000 kW
3 x 525-690 V.....	450-1400 kW

Fieldbus

MOD	META	BAC		
DN	LON	BAC	TCP	EIP
PB	PN	BIP		

Protection Rating

IP00	IP20	IP21/Type 1
■	■	■
IP54/Type 12	IP55/Type 12	IP66/Type 4X
■	■	■

VACON® NXP drives' broad range provides solutions, no matter what type of AC drive you require. Air-cooled or liquid-cooled, wall-mounted or floor-standing, bottom or top cable entry, 6-pulse, 12-pulse or Active Front End (AFE) are just some of the options available.

As a standard, they are designed to operate reliably with cable lengths of up to 300 m power (built-in size dependent), without the need for additional output filters. They include an AC choke harmonic filter. The RFI Filters can be configured to provide different levels of EMC performance as required, including compliance with the most generally specified international EMC standard for mining and mineral processing facilities, IEC 61800-3 Category C3.

Active Front End (AFE) versions of the VACON® NXC and AFE modules combined with separate Inverter Unit (INU) modules provide solutions for regenerative applications and when low harmonic current distortion is required.

The VACONR 100 INDUSTRIAL drives are designed to operate reliably with cable lengths of up to 200 m (power size dependent), including a built-in DC-link choke harmonic filter and a built-in RFI filter, ensuring compliance with at least IEC 61800-3 Category C3.

The built-in PLC functionality, according to IEC61131-3 of both the VACON® NXP and VACON® 100, enables OEMs to integrate their own functionality in the drives.



VACON® NXP and VACON® NXC Air Cooled

Used extensively for all mining and mineral processing equipment applications and on stockyards and bulk material handling facilities including:

- Conveyors
- Feeders
- Crushers
- Mills
- Screens
- Slurry Pumps
- Flotation Cells
- Paste Thickeners
- Ship Loaders
- Stackers
- Reclaimers
- Mine Ventilation Fans
- Dewatering Pumps

The below kW ratings are based on High Overload ratings.

Power Range

3 x 208-240 V.....	0.37-75 kW
3 x 380-500 V.....	0.75-1100 kW
3 x 525-690 V.....	2.2-1800 kW

Power Range - Low Harmonic Drive

3 x 380-500 V.....	110-1200 kW
3 x 525-690 V.....	90-1800 kW

Power Range - 12-Pulse Drive

3 x 380-500 V.....	160-1100 kW
3 x 525-690 V.....	200-1800 kW

Fieldbus

MOD	META			
DN	CAN	PB	TCP	EIP
BAC	PN	LON		

Protection Rating

IP00	IP20	IP21/Type 1
■		■
IP54/Type 12	IP55/Type 12	IP66/Type 4X
■		■

VACON® NXP IP00 drive modules

These compact drive modules with separate AC chokes, separate front-end and inverter unit modules for higher powers, are ideally suited for applications where the drive needs to be built into low height enclosures. This is common on underground coal mine motor starter skids.

Complemented by a comprehensive range of air-cooled VACON® NXP common DC bus modules and VACON® NXP liquid-cooled drives and modules, there isn't a tight space or harsh environment where we can't provide you with an AC drive that meets your requirements.

The below kW ratings are based on High Overload ratings.

Power Range

3 x 380-500 V.....	160-1100 kW
3 x 525-690 V.....	200-1800 kW

Fieldbus

MOD	META			
DN	CAN	PB	TCP	EIP
BAC	PN	LON		

Protection Rating

IP00	IP20	IP21/Type 1
■		■
IP54/Type 12	IP55/Type 12	IP66/Type 4X
■		■

VACON® 100 INDUSTRIAL

The VACON® 100 INDUSTRIAL is a workhorse for a wide range of industrial applications. It is easy to integrate into all major control systems and easily adaptable to various needs. All power sizes are available as drive modules.

The free-standing enclosed drive for higher power sizes contains a wide range of configurable options and an innovative control compartment, for safe access without having to open the cabinet door.

The below kW ratings are based on High Overload ratings.

Power Range

3 x 208-240 V.....	0.37-75 kW
3 x 380-500 V.....	0.75-500 kW
3 x 525-690 V.....	4-630 kW

Fieldbus

MOD	META	BAC	TCP	BIP
PB	DN	CAN	BAC	LON
TCP	EIP	PN	ECAT	

Protection Rating

IP00	IP20	IP21/Type 1
■		■
IP54/Type 12	IP55/Type 12	IP66/Type 4X
■		■

*Dependent on the enclosure size.



Adverse Effects of the Harmonics

- Limitations on Supply & Network Utilization
- Increased Transformer, Motor & Cable Heating
- Reduced Equipment Lifetime
- Costly Equipment Downtime
- Control System Malfunctions
- Pulsating & Reduced Motor Torque
- Audible Noise

Harmonics Mitigation

While AC drives help to optimize production, save energy and extend equipment lifetime, they also introduce harmonic currents to the mine-site grid. If not kept under control, these harmonics can affect the performance and reliability of generators and other equipment.

Harmonic Mitigation Solutions

The reliable estimation of the harmonic impact of AC drives on the mine sites electrical system combined with the use of optimum mitigation equipment, helps plants avoid the hidden and often expensive consequences of harmonic distortion.

All VLT® and VACON® drives supplied for mine site installations, incorporate a DC-link choke or AC choke first level, harmonic filter as a standard. If needed additional harmonic filters and mitigation solutions, as well as software tools for calculating harmonic mitigation requirements are available. We have a wide range of mitigation solutions which can help restore weak networks, increase network capacity, and meet compact retrofitted demands or even secure sensitive environments:

- Advanced Active Filters
- Advanced Harmonic Filters
- Low Harmonic Drives
- AFE Low Harmonic Drives
- 12-Pulse Drives

By using reliable estimations of the harmonic impacts of AC drives, plants can avoid the hidden and often expensive consequences of harmonic interference: i.e. erratic performance or the overloading of motors, circuit breakers and power factor correction devices.

The VLT[®] Motion Control Tool MCT 31 software allows for a quick evaluation of whether additional harmonic mitigation is required. If needed, the software can determine an optimal harmonic mitigation resolution particular to the project to avoid unnecessary and costly over-engineering.

Easy to Use

The VLT[®] Motion Control Tool MCT 31 software tool is easy to use, requiring only the input of a few points of readily available data, to get an initial assessment of the harmonic impact on the mains supply. The more data entered, available from electrical load lists and cable schedules, the more accurate the results are improved.

Commissioning Software

Easy Engineering and Setup

The Windows-based software tool provides easy configuration via a PC and provides plant managers with a comprehensive overview of all the drives in a system of any size. They add a new level of flexibility in configuration, monitoring and troubleshooting.

VLT[®] Motion Control Tool MCT 10

An engineering tool enabling data exchange over a traditional RS485 interface, Fieldbus (PROFIBUS, Ethernet, and more) or via USB. Usable with all VLT[®] drives.

VACON[®] NCDrive

A commissioning tool for the VACON[®] NXP drives, allowing for real-time parameterization and monitoring via the standard RS-232 connection or optional CAN bus option card.

VACON[®] Live Commissioning Tool

Supportive of the VACON[®] 100 Family of AC drive products. Real-time parameterization and monitoring are available via the standard RS-485 connection using an RS-485 to USB converter or through the built-in Ethernet port (AutoDHCP or Static IP).

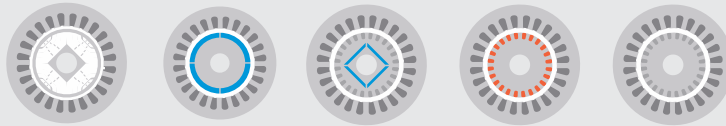
The use of these software tools reduce the risk of incorrect configuration and facilitates rapid troubleshooting. They are especially useful tools for documenting and recording as-commissioned settings for each AC drive on your site.



To enjoy the benefits of a single drive platform, with cost savings in training, service, and storage of spare parts:

- Select a quality VLT® or VACON® drive to meet your specific requirements
- Select the most reliable and efficient motor for the best value; for your system, enabled by the 'one-drive-for-all motors' concept

Each VLT® or VACON® drive is configurable, compatible and efficiency-optimized for all typical motors, liberating you from the performance and price restrictions of bundled motor-drive package deals.



Global Service Network

VLT® and VACON® drives operate on mine sites, stockyards, bulk materials handling facilities, processing plants and related port facilities all over the world.

No matter where or what your project, you can be sure our drives will be there to back you up. You can get immediate access to our expertise through your local BMG Branch to minimize downtime and maximize productivity at your facility. Our experts, located at more than 100 branches, are always ready to support you with engineering and application advice and service.

Our range of DrivePro® services provides you with expert support exactly where you need it, right on time. We remain on the job until your drives challenges are solved.



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In the bid to procure cutting-edge components at competitive prices, BMG is able to capitalise on long-standing relationships with leading manufacturers dedicated to excellence in design and production.

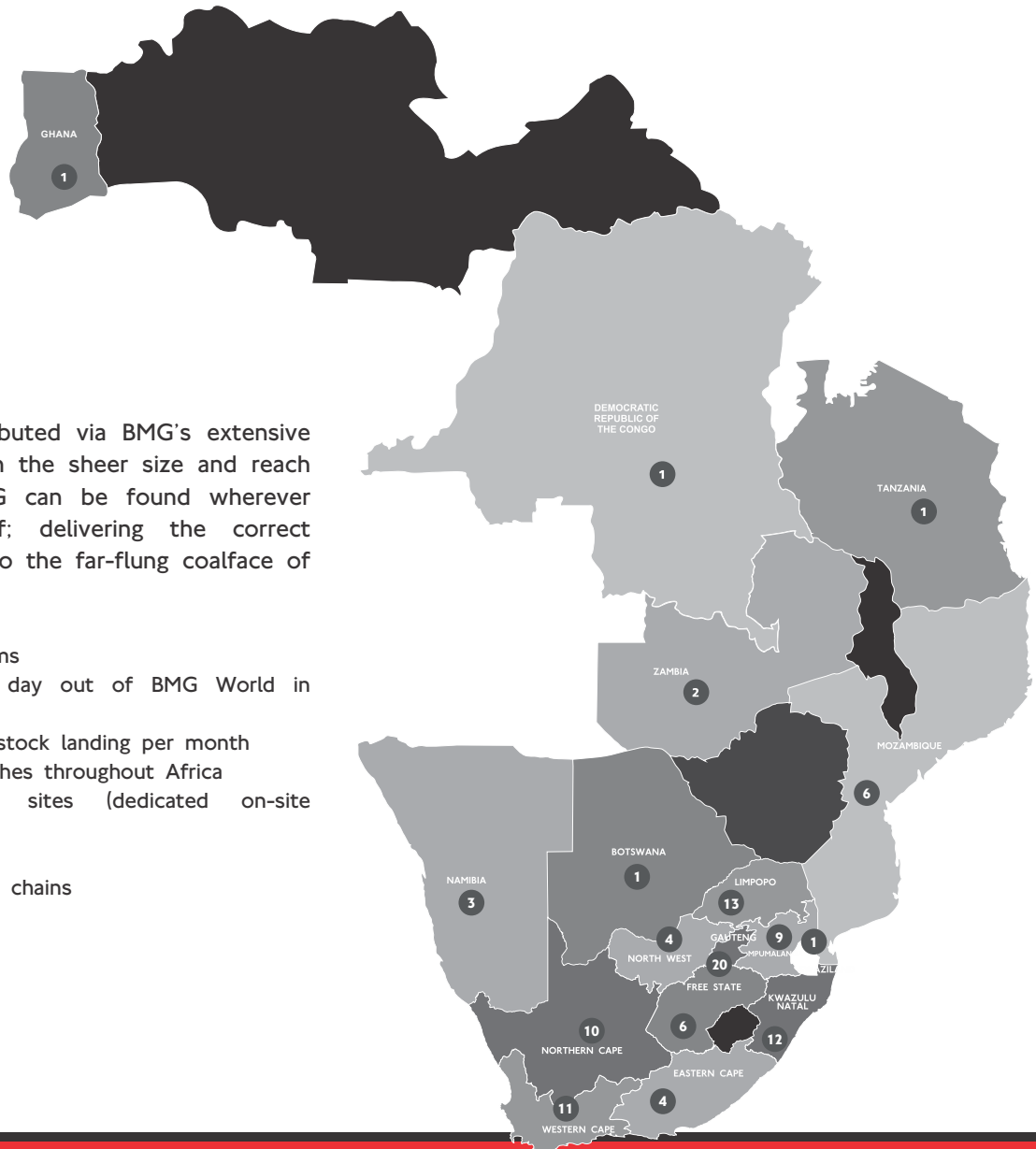
Products are imported from around the globe and brought to BMG's strategically located distribution facilities and regional service centres via the main distribution hub in Johannesburg - BMG World. A world-class facility boasting 308 000m³ of fully stocked warehouse space, an accredited training facility and unlimited engineering capabilities.

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Products and services are distributed via BMG's extensive distribution network. It's through the sheer size and reach of our infrastructure, that BMG can be found wherever industry has established itself; delivering the correct components at the right time, to the far-flung coalface of our customers' operations.

- Over 300 000 product line items
- Around 4 500 transfers per day out of BMG World in Johannesburg
- Over 1 000 tons of imported stock landing per month
- 105 strategically situated branches throughout Africa
- Vendor Managed Inventory sites (dedicated on-site stockholding)
- International exports
- Locally empowered distribution chains

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