



AGRICULTURAL PRODUCT

Catalogue

Edition 4



B-BBEE 2
EMPOWERING SUPPLIER

ISO 9001	Certified
ISO 14001	Certified
ISO 45001	Certified

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 9 countries with the widest range of industrial engineered products and expert services in Africa via 88 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 2 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.



VARIABLE SPEED DRIVES

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Various expansion cards:

- Encoder option
- Water pump controller
- PLC function card

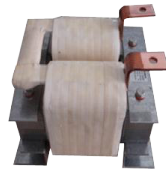
Braking unit and braking resistor: For regenerative applications



AC input reactor & DC reactor for reduction of harmonic distortion.



AC input reactor



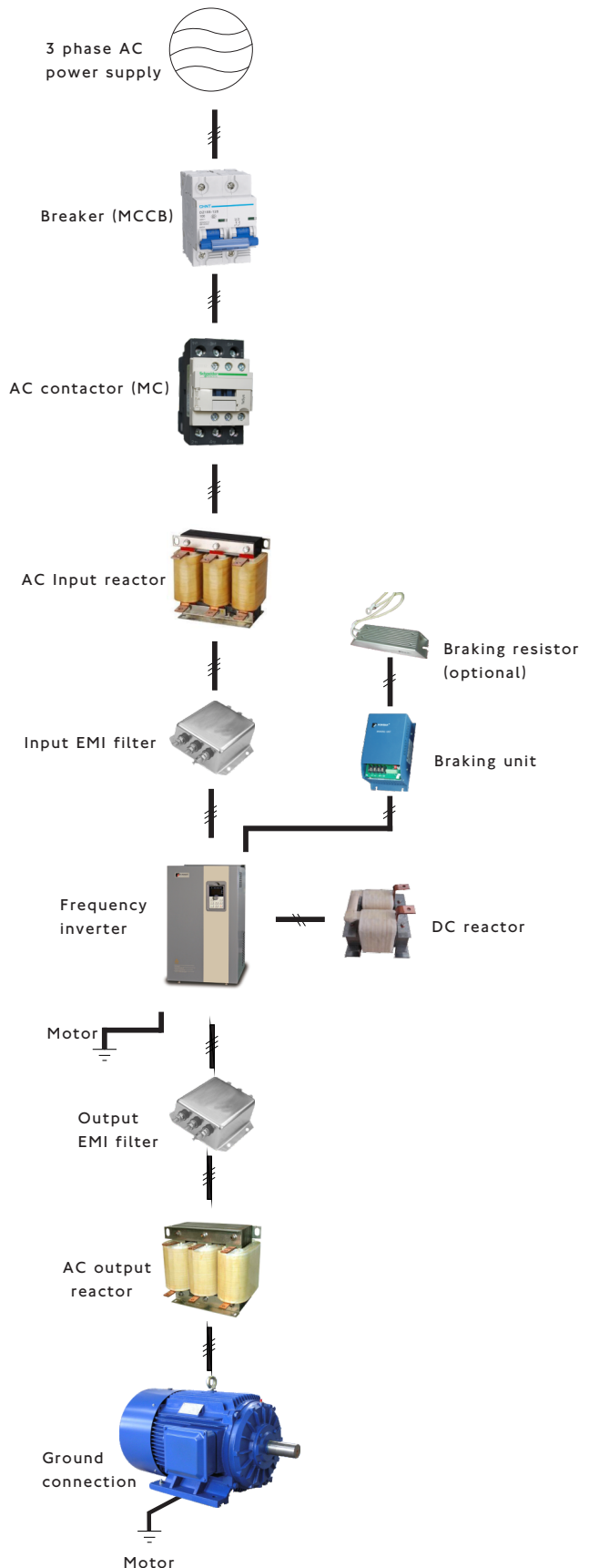
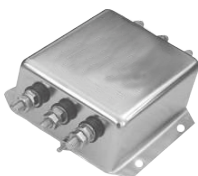
DC reactor

Output reactor for long motor cables and Du/Dt reduction.



AC output reactor

EMI filters to reduce FRI noise.





Inverter model

Output rating

Input rating

Output specifications

Bar code

Serial No.

BMG MOTOLINE

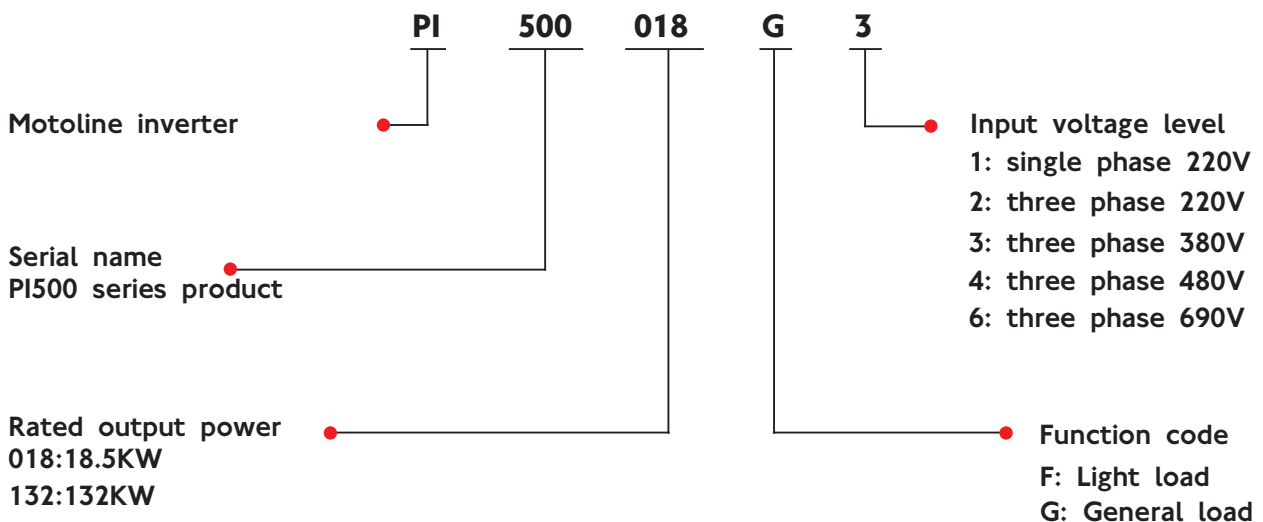


MODEL:	PI500 018G3
POWER:	18.5 kW
INPUT:	AC 3PH 380V(-15%)-440V(+10%) 50Hz/60Hz
OUTPUT:	AC 3PH 0V-Vin37A 0-400Hz

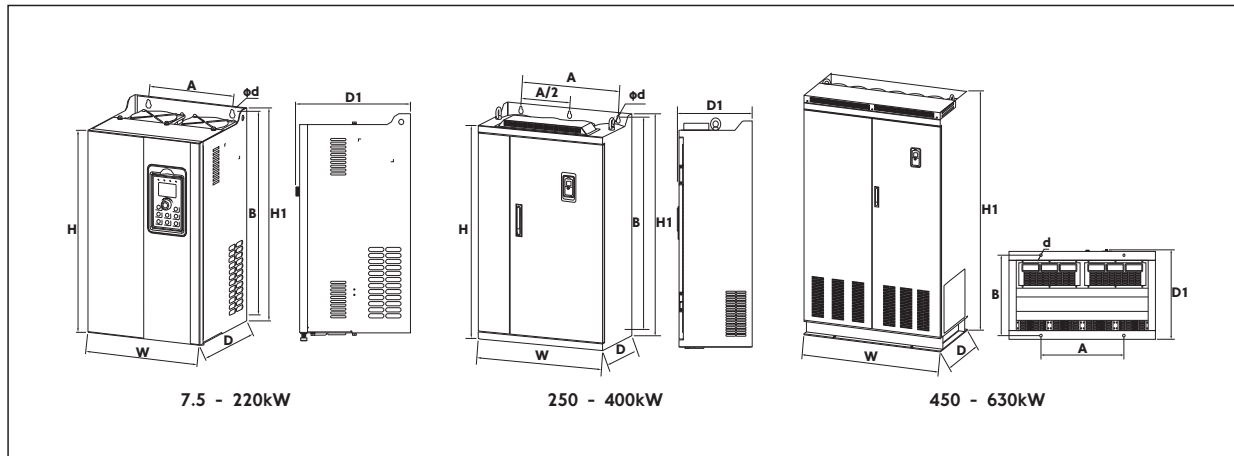


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MODEL DESCRIPTION



TECHNICAL SPECIFICATIONS



INVERTER MODEL	OUTPUT POWER (kW)	INPUT CURRENT (A)	OUTPUT CURRENT (A)	DIMENSION (H1 x W x D1mm)					INSTALLATION (A x B dmm)			N.W (kg)
				H	H1	W	D	D1	A	B	d	
PI500-5R5G1	5.5	50	25	280	300	190	190	198	140	285	6	7.2
PI500-7R5G1	7.5	74	32	330	350	210	190	198	150	335	6	9.5
PI500-011G1	11	84	45									
PI500-015G1	15	115	60	380	400	240	215	223	180	385	7	13
PI500-018G1	18.5	144	75									
PI500-022G1	22	169	90	500	520	300	275	283	220	500	10	41.2
PI500-030G1	30	220	110									
PI500-037G1	37	276	152									
PI500-045G1	45	325	176	550	575	355	320	328	250	555	10	58
PI500-055G1	55	380	210									
PI500-5R5G2	5.5	28	25	280	300	190	190	198	140	285	6	7.2
PI500-7R5G2	7.5	37.1	32									
PI500-011G2	11	49.8	45	330	350	210	190	198	150	335	6	9.5
PI500-015G2	15	65.4	60									
PI500-018G2	18.5	81.6	75	380	400	240	215	223	180	385	7	13
PI500-022G2	22	97.7	90									
PI500-030G2	30	122.1	110	500	520	300	275	283	220	500	10	41.2
PI500-037G2	37	157.4	152									
PI500-045G2	45	185.3	176									
PI500-055G2	55	214	210	550	575	355	320	328	250	555	10	58
PI500-075G2	75	307	304									
PI500-093G2	93	383	380	790	820	480	360	368	370	800	11	108
PI500-110G2	110	428	426									
PI500-132G2	132	467	465	940	980	705	380	388	550	945	13	190
PI500-160G2	160	522	520									

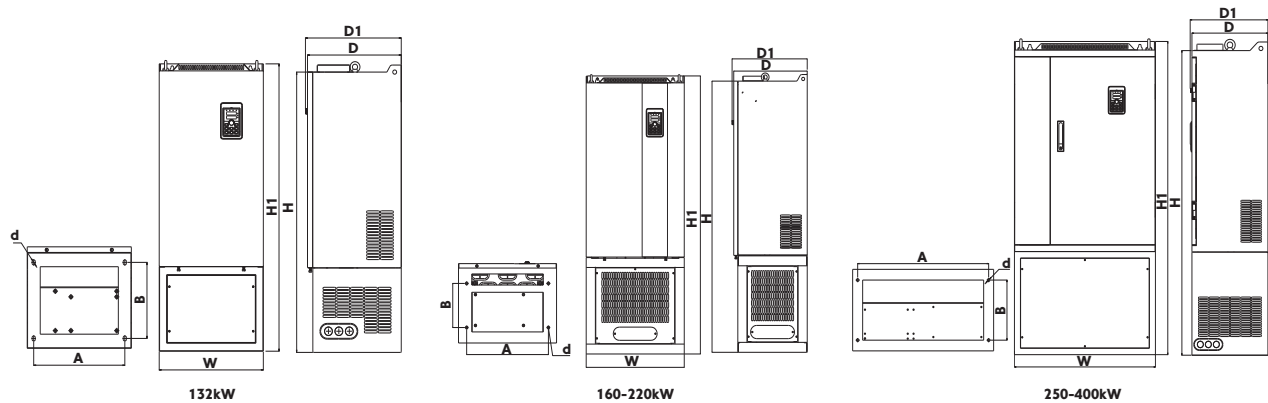
After installing the screw rings, the height dimensions is: H1 + 15mm.

TECHNICAL SPECIFICATIONS

INVERTER MODEL	OUTPUT POWER (kW)	INPUT CURRENT (A)	OUTPUT CURRENT (A)	DIMENSION (H1 x W x D1mm)					INSTALLATION (A x B dmm)			N.W (kg)
				H	H1	W	D	D1	A	B	d	
PI500-7R5G3/011F3	7.5/11	20.5/26	17/25	280	300	190	190	198	140	285	6	7.2
PI500-011G3/015F3	11/15	26/35	25/32									
PI500-015G3/018F3	15/18.5	35/38.5	32/37									
PI500-018G3/022F3	18.5/22	38.5/46.5	37/45	330	350	210	190	198	150	335	6	9.5
PI500-022G3/030F3	22/30	46.5/62	45/60									
PI500-030G3/037F3	30/37	62/76	60/75	380	400	240	215	223	180	385	7	13
PI500-037G3/045F3	37/45	76/91	75/90									
PI500-045G3/055F3	45/55	91/112	90/110	500	520	300	275	283	220	500	10	41.2
PI500-055G3/075F3	55/75	112/157	110/150									
PI500-075G3	75	157	150									
PI500-093F3	93	180	176	550	575	355	320	328	250	555	10	58
PI500-93G3/110F3	93/110	180/214	176/210									
PI500-110G3/132F3	110/132	214/256	210/253									
PI500-132G3/160F3	132/160	256/307	253/304	695	720	400	360	368	300	700	10	72.5
PI500-160G3/187F3	160/187	307/345	304/340	790	820	480	360	368	370	800	11	108
PI500-187G3/200F3	187/200	345/385	340/380									
PI500-200G3/220F3	200/220	385/430	380/426									
PI500-220G3	220	430	426									
PI500-250F3	250	468	465	940	980	705	380	388	550	945	13	190
PI500-250G3/280F3	250/280	468/525	465/520									
PI500-280G3/315F3	280/315	525/590	520/585									
PI500-315G3/355F3	315/355	590/665	585/650									
PI500-355G3/400F3	355/400	665/785	650/725									
PI500-400G3	400	785	725									
PI500-450F3	450	883	820	/	1700	1200	600	612	680	550	17	-
PI500-450G3/500F3	450/500	883/920	820/860									
PI500-500G3/560F3	500/560	920/1010	860/950									
PI500-560G3/630F3	560/630	1010/1160	950/1100									
PI500-630G3/700F3	630/700	1160/1310	1100/1250									

TECHNICAL SPECIFICATIONS

with DC choke



INVERTER MODEL	OUTPUT POWER (kW)	INPUT CURRENT (A)	OUTPUT CURRENT (A)	DIMENSION (H1 x W x D1mm)					INSTALLATION (A x B dmm)			N.W (kg)
				H	H1	W	D	D1	A	B	d	
PI500-132G3R/160F3R	132/160	256/307	253/304	995	1020	400	360	368	350	270	13*18	114.5
PI500-160G3R/187F3R	160/187	307/345	304/340	1230	1260	480	360	368	400	200	13	153
PI500-187G3R/200F3R	187/200	345/385	340/380									
PI500-200G3R/220F3R	200/220	385/430	380/426									
PI500-200G3R	220	430	426									
PI500-250F3R	250	468	465									
PI500-250G3R/280F3R	250/280	468/525	465/520	1419	1460	705	380	388	620	240	13	249.4
PI500-280G3R/315F3R	280/315	525/590	520/585									
PI500-315G3R/355F3R	315/355	590/665	585/650									
PI500-355G3R/400F3R	355/400	665/785	650/725									
PI500-400G3R	400	785	725									

Remark "PI500 series frequency inverter PI500-132G3R/160F3R to PI500-400G3R, "R" stands for "built-in DC choke, for example PI500-160G3R/187F3R." After installing the screw rings, the height dimensions is: H1 + 15mm.

Product Overview

The Synergy PI150 series of frequency inverters is a general purpose drive packed with many features and benefits.

A new generation of low-power inverters have been developed with unsurpassed reliability and user friendliness in mind.

As a compact size frequency inverter the PI150 has obvious advantages such as ease of installation, small footprint, low temperature rise, and powerful software performance.

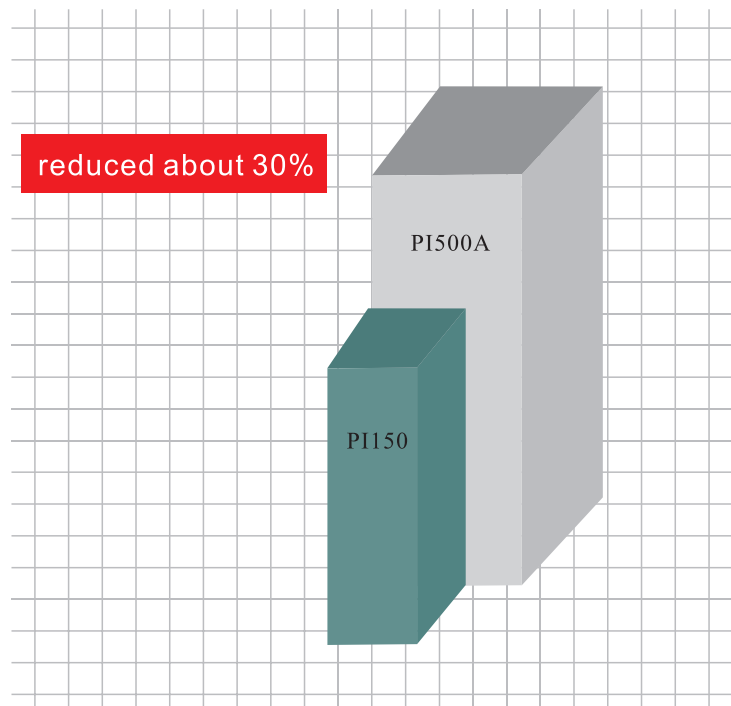


Feature

- Compact design
- Ease of installation and commissioning
- Energy efficient
- Electronic thermal relay (ETR)
- Automatic motor adaption (AMA)
- Flying start (catch a spinning motor)
- Built-in brake chopper (optional)



The PI150 2,2kW inverter volume compared to the equivalent Synergy PI500 volume.



Pi150 Series Inverters

Ease of installation

Multiple inverters can be mounted side by side with no need for spacing between the drives thus saving money by reducing the cabinet size and volume and providing a significant overall saving on the installation costs.



Ordinary inverter



PI150



Installed side by side, no need to reserve intervals



Screw installation, flexible



DIN-Rail mounting, quick and convenient

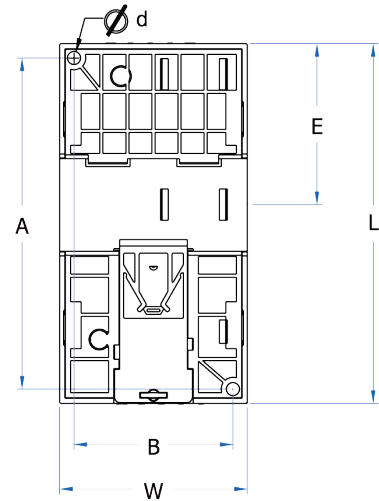
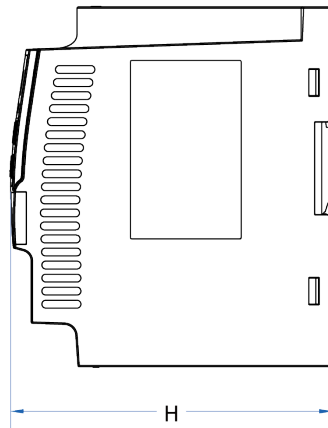
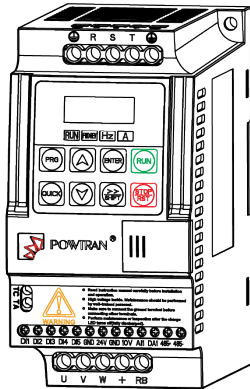
Technical Feature

Item	Fuction	Specification
Power	Rated voltage	AC 3 Phase 380V-440V
	Input frequency	50Hz / 60Hz
	Allowing fluctuations	Voltage -15% / +10% Input frequency fluctuation: $\pm 5\%$ Distortion satisfies IEC61800-2 standard.
Control	Control system	High performance vector control inverter based on DSP
	Control method	V/F control, vector control W/O encoder.
	Acceleration/deceleration control	Straight or S-curve mode. Four times available and time range is 0.0 to 6500.0s.
	V/F curve mode	Linear, square root/m-th power, custom V/F curve
	Overload capability	G type: rated current 150% - 1 minute, rated current 180% - 2 seconds
	Maximum frequency	1) Vector control: 0 to 300Hz; 2) V/F control :0 to 3200Hz
	Carrier Frequency	0.5 to 16kHz; automatically adjustable carrier frequency according to the load characteristics.
	Input frequency resolution	Digital setting: 0.01Hz Analogue setting: maximum frequency *0.025%
	Start torque	G type: 0.5Hz/150% (vector control W/O encoder)
	Speed range	1:100 (vector control W/O encoder)
	Steady-speed precision	Vector control W/O encoder $\pm 0.5\%$ (rated synchronous speed)
	Torque response	40ms (vector control W/O encoder)
	Torque boost	Automatic torque boost; manual torque boost (0.1% to 30.0%)
	DC braking	DC braking frequency: 0.0Hz to max. frequency, braking time: 0.0 to 100.0 seconds, braking current value: 0.0% to 100.0%
	Jogging control	Jog Frequency Range: 0.00Hz to max. frequency; Jog Ac/ deceleration time: 0.0s to 6500.0s
	Built-in PID	Easy to configure closed-loop control system.
	Automatic voltage regulation (AVR)	Automatically maintain a constant output voltage when the voltage of electricity grid changes.
Torque limit and control	Automatically track current and motor torque when the inverter starts.	
Personalization Function	Self-inspection of peripherals after power-on	After powering on, peripheral equipment will perform safety testing, such as ground, short circuit, etc.
	Quick current limiting	The current limiting algorithm is used to reduce the inverter over current function, and will improve the drives current limit capability
	Timing control	Timing control function: time setting range (0m to 6500m)
Protection function	Inverter protection	Overvoltage protection, undervoltage protection, overcurrent protection, overload protection, overheat protection, overcurrent stall protection, overvoltage stall protection, loss of phase protection (optional), communication error, PID feedback signal failure, PG failure and short circuit to ground protection.

Pi150 Series Inverters

Running	Input signal	DI input terminal	5 digital input terminals
		AI 1 analogue input	1 analogue input terminals respectively for optional range (0 /4 -20mA or 0-10V)
		Multi-speed	Up to 16-speeds can be set (by using the multi- function terminals or program)
		Emergency stop	Interrupt controller output
		Fault reset	When the protection function is active, you can automatically or manually reset the fault condition.
		PID feedback signal	Including DC (0 to 10V), DC (0/4 to 20mA)
	Output signal	Output signal	Relay output; DA1 analogue output
		Relay output	There are up to 40 different output signals, Contact capacity: normally open contact 5A/AC 250V, 1A/DC 30V.
		DA1 analogue output	Analogue output for 16 different signals. Output signals: 0-10V - 0/4 -20mA
	Running command channel		Three channels: operation panel, control terminals and serial communication port. They can be switched through a variety of ways.
Frequency source		Total 7 frequency sources: digital, analog voltage, analog current, multi-speed and serial port. They can be switched through a variety of ways	
Run function		Limit frequency, jump frequency, frequency compensation, auto- tuning, PID control	
Display	LED display keyboard	Running information	Monitoring functions including: running frequency, set frequency, bus voltage, output voltage, output current, output power, output torque, input terminal status, output terminal status, analog AI1 value, motor Actual running speed, PID set value percentage, PID feedback value percentage.
		Error message	Three error messages are stored, includes the time, type, voltage, current, frequency and status when the failure is occurs.
	Key lock and function selection		Lock part or all function keys, define the function scope of some keys to prevent misuse.
	IGBT temperature		Show's the inverter IGBT temperature
Communication	RS485	Built in 485	
Environment	Environment temperature		-10°C to 50°C (40 °C to 50°C requires derating)
	Storage temperature		-20 °C to 65 °C
	Environment humidity		Less than 90% R.H, no condensation.
	Vibration		Below 5.9m/s2(= 0.6g)
	Application sites		Indoor: no sunlight or corrosive or explosive gas and water vapor, dust, flammable gas, oil mist, water vapor, etc.
	Altitude		Up to 1000m, above 1000m derate 1% for every 100m above 1000m, do not use above 3000mtrs
	Protection level		IP20
Product standard	Product safety standards		IEC61800-5-1: 2007
	Product EMC standards		IEC61800-3: 2005
Cooling method		Forced air cooling	
Installation method		DIN-Rail mounting, screw mounting	

Specification and size



Inverter model	Voltage (V)	Output power (kW)	Input Current (A)	Output Current (A)	Dimensions (mm)			Installation dimensions (mm)			DIN-R rail mounting (mm)	N.w (kg)
					L	W	H	L	W	H		
PI150-0R7G3(Z)	3PH 380V (-15%)	0.75	5.4	2.5	138	72	123.5	127	61	Ø5	62	1.1
PI150-1R5G3(Z)		1.5	8.2	4.0								
PI150-2R2G3(Z)		2.2	14.0	7.0								
PI150-004G3(Z)	440V (+10%)	4	23.0	10	163	72	134	175	45	Ø5	82	1.3
PI150-5R5G3(Z)		5.5	4.1	2.5								

* The Model(Z) with brake unit is Optional

Applications



Applications: Machine tools, packing, printing, food and beverage, irrigation and pumping, blowers, fans, conveyors, mixers, etc.

BMG was approached by a Maize / Pecan Nut farmer in the Barkly West area to look at what benefit there could be in installing variable speed drives on a pump set.



BACKGROUND

- Farming operations are limited by a power supply of only 200 KVA, +/- 300 Amps.
- Pumping / irrigation is the largest consumer of power on this farm.
- The farmer would like to expand his crop production to include not only maize but also pecan nuts, but cannot because of the power supply limitations.
- The cost of irrigation per hectare needs to be reduced.
- The limited power supply needs to be used more efficiently.
- Presently one of the pump sets supplies five centre pivots and some orchards.
- The first pump set consists of 1 x 37kW, 1 x 22kW and 2 x 11kW pumps.
- This equates to an installed power of 81kW, with an absorbed power of 75kW, which means that the pump set draws a current of +/- 150 Amps.
- Presently the pumps are started by star / delta starters.
- The only form of flow control is valves.

PROPOSAL

- To install Electronic Variable Speed Drives on all pumps.
- To control these pumps by means of pressure transducers set to match the varying demands of the different irrigation scenarios that present themselves.
- To stop using the valves as a means to limit flow as this is highly inefficient.
- One of the main reasons for the success of this project is that to ensure that the units are employed to their maximum capability we undertook the installation and commissioning of the products ourselves.
- With an extensive branch network of over 100 branches, BMG offers its customers unmatched product availability and support. We also need to supply top quality products, therefore we rely on top AC drives manufacturers.

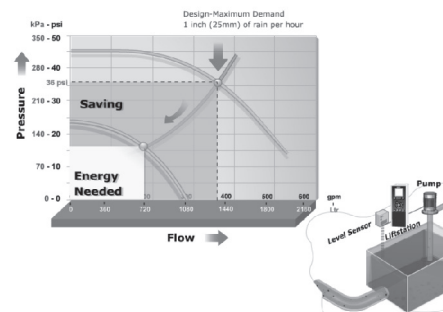
BENEFITS

- The benefits gained by selecting VSD's for this application are:
- Soft start and soft stop, thus preventing water hammer and the possibility of burst pipes.
- Closed loop controllers, meaning that the only piece of peripheral equipment that is required is a pressure transducer. No pump controller is necessary.
- In addition, BMG is able to offer 24/7 support all year round. Accredited technical staff and an extensive spares stock holding allow BMG's Electronics Division to be able to support its customer base.

RESULTS

- After installing the VSD's and setting the set point to 2,8 bar we are now able to run this same pump set with an absorbed power of 51kW, a saving of 24kW or 50 amps.
- The payback calculation based on the farmer's investment in

1.1.3 Applications - Adjustable speed with a FC



COST SAVINGS

DUTY CYCLE FLOW (%)	TIME (hrs)	TIME SYSTEM	CONSTANT VOLUME kW-hr/yr	AC DRIVE
90%	3	187	10,230	8,453
80%	9	562	29,191	19,348
70%	21	1,310	64,492	34,045
60%	23	1,435	66,267	27,866
50%	23	1,435	61,127	20,778
40%	16	998	38,087	10,896
30%	5	313	10,130	2,647
		6,240	279,524	124,033

kW/hr saving
155,491

Annual cost saving
R108,844

Simple payback time:
1 Year

AC MOTOR DATA	
Motor power	81kW
Motor efficiency	90%

ELECTRICITY DATA	
Cost per kWh	R0.700
Utility incentive	R0.00

SYSTEM DATA	
Design head	2.8bar
Set point static head	0.2bar
Shaft power	51.0kW
Removed pressure drop	0.1bar

DRIVE DATA	
Drive power	81kW
Drive efficiency	98%
Drive system cost	R125,000

BRINGING THE WORLD'S BEST BRANDS TO YOU

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.

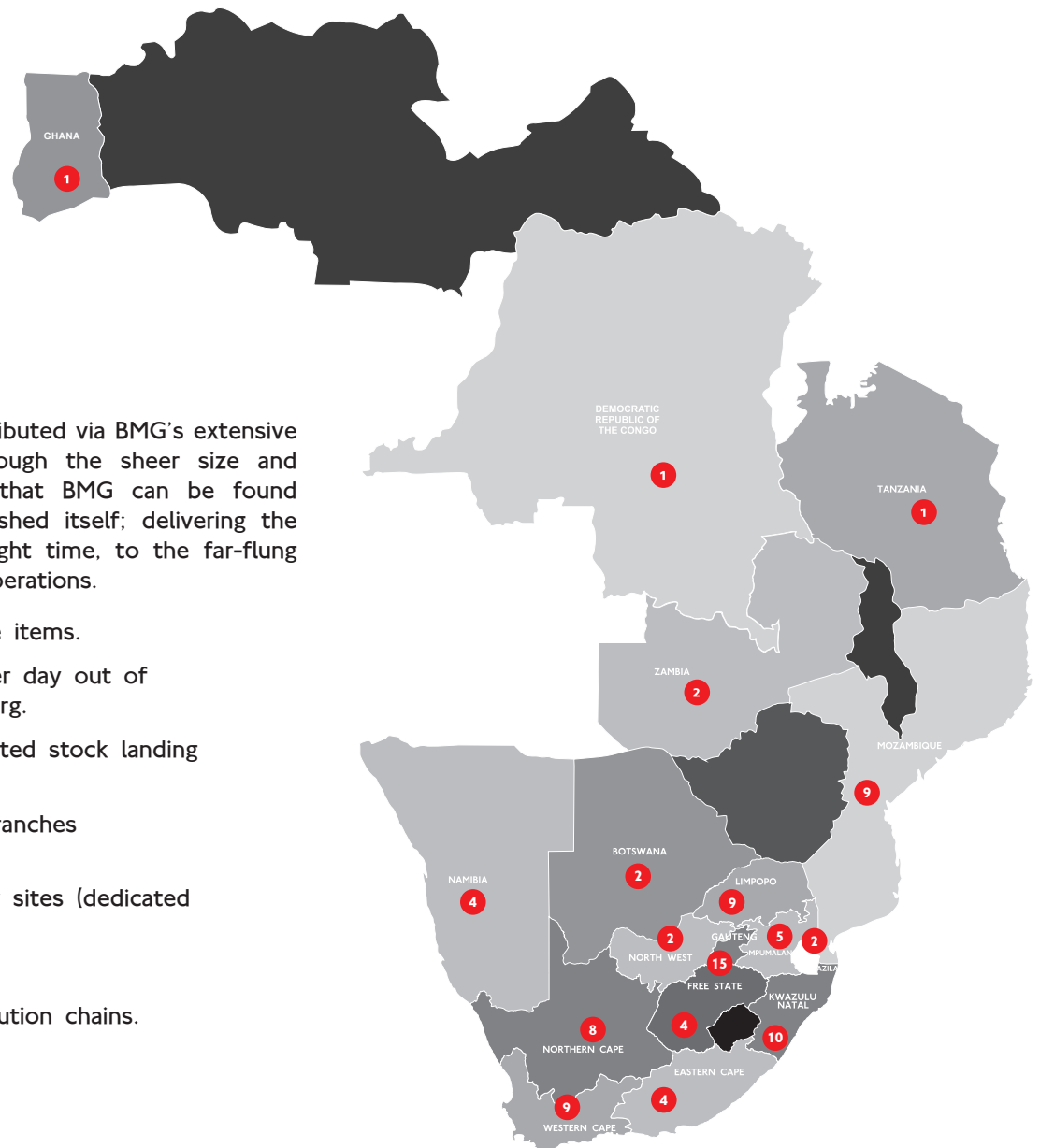
Products are imported from around the globe and brought to BMG's strategically located distribution facilities and regional service centres via the main distribution hub in Johannesburg - BMG World. A world-class facility boasting 308 000m³ of fully stocked warehouse space, an accredited training facility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

Our Extensive Coverage Throughout Africa

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BRANCHES

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.
- 88 strategically situated branches throughout Africa.
- Vendor Managed Inventory sites (dedicated on-site stockholding).
- International exports.
- Locally empowered distribution chains.



24 HR TOLL-FREE EMERGENCY
BRANCH HELPLINE:

0800 022 224

WEBSITE:

www.bmgworld.net



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FILTRATION • LUBRICATION • FIELD SERVICE