



DGM Series

Decentralized Gearmotor



PRODUCTS &
SOLUTIONS



Summary



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Introduction

Bonfiglioli's experience brings you DGM - the new range of decentralized inverters for asynchronous motor control. DGM is supplied with the gearmotor or separately, for wall or onboard assembly. If the inverter is supplied with the gearmotor, the mechanical assembly, wiring and basic programming are performed by Bonfiglioli, thus reducing installation times and operations required and limiting the risk of errors to a minimum. Design and installation are faster compared to inverters installed in centralized switchboards.

DGM0

Single-phase only entry-level version with compact housing and reinforced plastic adapter.

- 0.25... 0.75 kW



DGM1

Single-phase version with a wide range of configuration options.

- 0.37... 1.1 kW



DGM3

The same as DGM1, but in the three-phase version, with a wide range of configuration options.

- 0.55... 22 kW



Advantages

Applying the inverter directly on the gear motor brings several advantages to machine and plant manufacturers and users, such as:

- **Application switchboard volume and** cooling system reduction, since the inverters do not need to be installed and the related EMI filters are already integrated in the inverter.
- **Streamlined and simpler plant design.**
- **Plant extensibility not affected by switchboard capacity.**
- **No expensive shielded power cables required** (otherwise necessary to meet the EMC standards).
- **High remote control potential, thanks to the wide range of digital and analog inputs and outputs available,** as well as a wide range of the most widespread fieldbus.

Applications

Thanks to its characteristics, the DGM system can be used in many different fields and applications, such as:



PUMPS



COMPRESSORS



FANS



MIXERS



ROLLING
CONVEYORS



ROTATING TABLES



AUGERS



CONVEYOR BELTS

Housing

DGM is available in 5 different sizes, based on the power selected and on its configuration. They have been designed to optimize their size and the heat dissipation process.

This compact and sturdy housing made of die-cast aluminum ensures excellent impact and vibration resistance (up to 5 g).

The high degree of IP65⁽¹⁾ protection ensures dust and water spray resistance.

The inverter can also be used outdoors, and in aggressive environments characterized by the presence of ammonia or alkaline solutions, such as swimming pools.

The DGM range is optimized to ensure passive ventilation cooling up to 7.5kW, is supplied with an EMC filter embedded in the inverter, and can operate in a very wide temperature range (-25°C...+50°C) without derating.

Two LEDs installed on the housing display the inverter operating status.

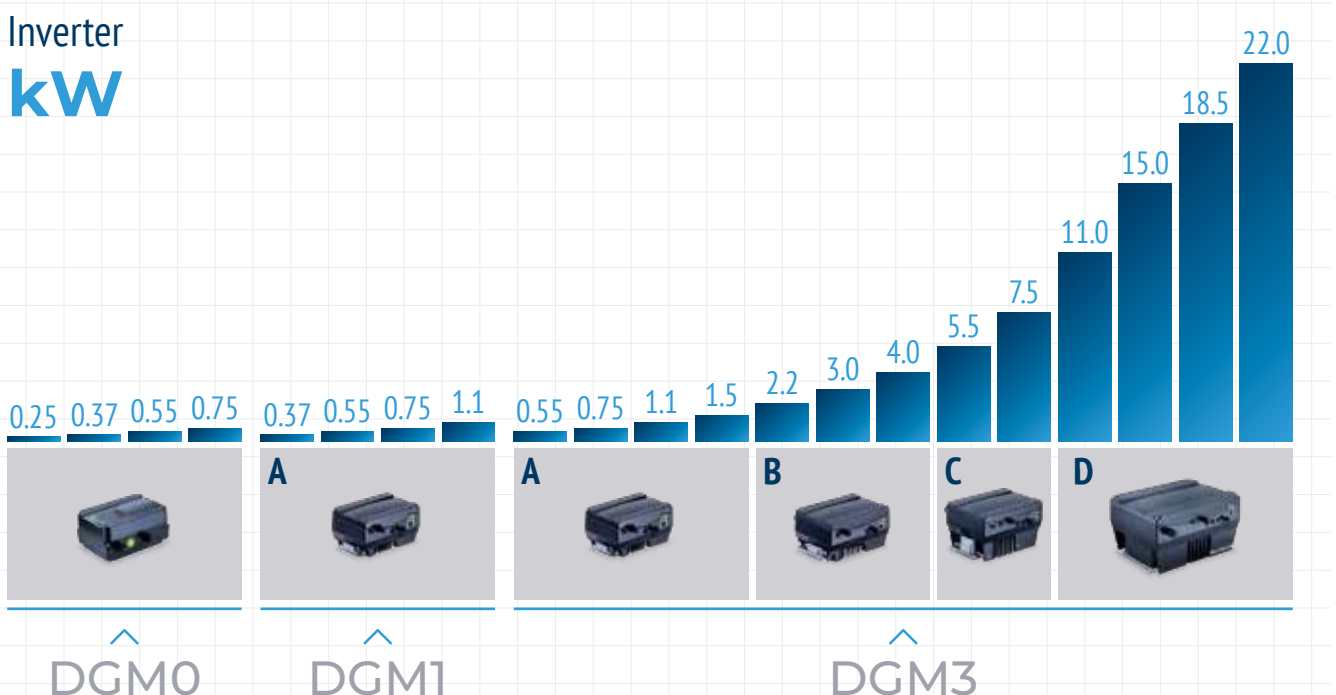
Lastly, the 0...100% knob potentiometer - available in the Standard version - ensures an easy speed or PID control.

Note:

(1) Size D is equipped with two auxiliary fans installed near the heat exchanger; size D degree of protection is IP55.

To know the motor degree of protection, see the relevant catalog.

Power is distributed in the different housings according to the following table:



Electric characteristics

DGM is available in single-phase version for power between 0.25 kW and 1.1 kW, and in three-phase version for power between 0.55 kW and 22 kW.

The power voltage range is very wide, to adapt to any type of mains.

- Single-phase version: from 100 Vac to 230 Vac 50/60 Hz or from 140 Vdc to 320 Vdc
- Three-phase version: from 200 Vac to 480 Vac 50/60 Hz or from 280 Vdc to 680 Vdc.

If the inverter is supplied with the motor, it is wired according to the following rules:

- Single-phase inverter: 230 Vac motor connection (Star or Triangle, depending on the motor characteristics).
- Three-phase inverter: 400 Vac motor connection (Star or Triangle, depending on the motor characteristics).

The inverter is programmed with the motor plate values that match the wiring.

Embedded 24 Vdc voltage generated by the inverter for powering small loads.

Possibility of using the external 24 Vdc to power the electric part even without any power supply (only for DGM1 and DGM3 in standard version).

Operating characteristics



Control

- Sensorless Vector Control operation
- PID operation with automatic speed control
- Automatic starting torque optimization
- Configurable operation with typical quadratic curve
- Motor-potentiometer function
- Configurable quick restart



Fieldbus

- Fieldbus option (6 different fieldbus)
- Automatic scrolling compensation
- Braking chopper option



Safety and protection

- STO operating safety option
- Motor protection I²t function
- Locked shaft control
- Start error assessment
- Motor current limitation based on the settings
- Embedded EMC filter in all versions



Programming

- Cover embedded MMI option
- Cover embedded Foil Keypad option
- Wide range of configuration options, also thanks to the embedded PLC

VPlus Dec programming software

If supplied along with the gearmotor, DGM is preconfigured in Bonfiglioli's factories; in particular, motor parameters are set-up and autotuning is performed.

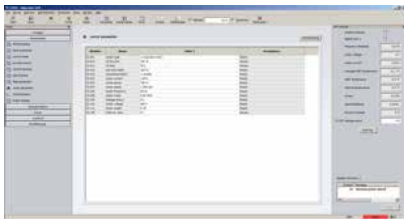
Based on their needs, user can change the settings via the MMI keypad available as an accessory, or with the VPlus Dec programming software.

The VPlus Dec PC software is available free of charge and is compatible with the latest Windows versions (Windows XP and later).

To connect the PC to DGM, use the programming cable available as an accessory.

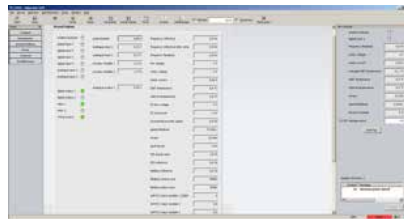
With the Vplus Dec programming software, users can easily perform all configuration, troubleshooting and testing operations.

The graphic interface is user-friendly and no specific training is required.



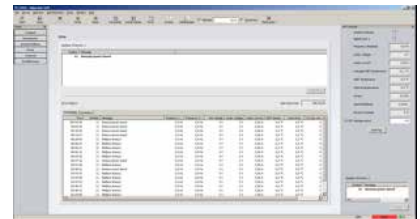
Parameters

- Changing the parameters value.
- Uploading and saving a parameter set from the inverter to the PC.
- Downloading parameters on the inverter.
- Assigning access levels.



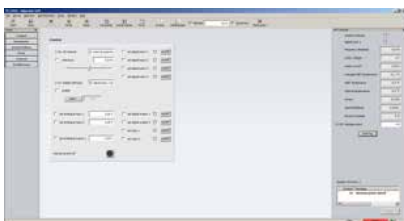
Actual values

Displays the inverter, digital inputs/ outputs, analog input/outputs and potentiometer operating values and process variables in real time.



Errors

- Displays the actual error.
- Displays the buffer with the latests 20 alarms.
- Displays the alarm counters divided by type.



Control system

- From here, you can control the inverter directly.
- Digital inputs/outputs overwriting.
- Analog inputs/outputs overwriting.
- Motor control frequency overwriting.
- This mode can be used during commissioning or testing.

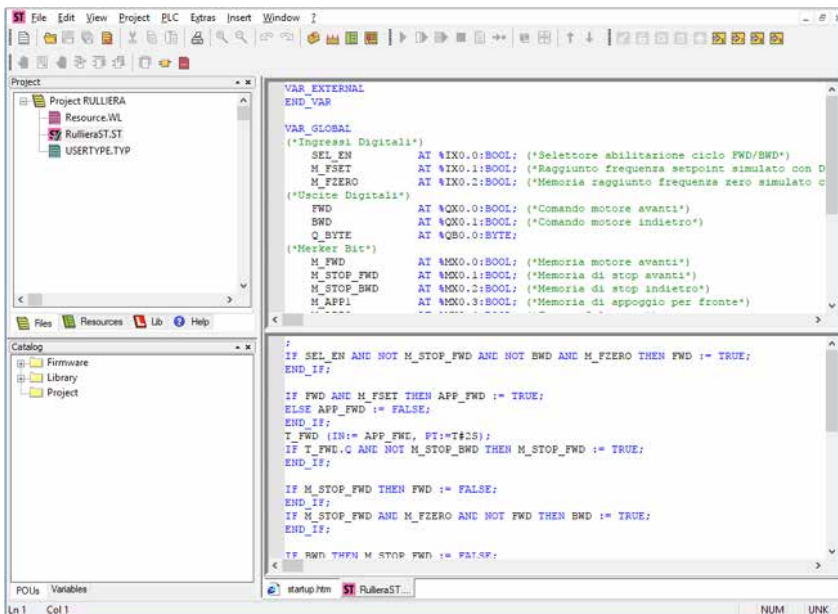


Oscilloscope

Possibility of managing up to 4 customizable channels. The oscilloscope data can be loaded in.csv and.txt format.

Soft PLC

All DGM are equipped with an embedded PLC, whose functions can be used via the Soft PLC program (IEC 61131-3). The PLC program can be used to customize the inverter functions. Programming can be performed in FBD (Function Block Diagram), ST (Structured Text), IL (Instruction List), LD (Ladder Diagram) and SFC (Sequential Function Chart) mode. The software is available free of charge.



DGM0



DGM0 is the most compact and cost-effective solution of remote sensorless vector inverter.

The DGM0 inverter is in single-phase version, with available power between 0.25 kW and 0.75 kW.

In the versions with nominal power comprised between 0.55 kW and 0.75 kW, the housing is equipped with cooling flaps on the top.

All DGM0 versions can be equipped with a membrane keyboard to control the motor directly.

The potentiometer is available as accessory and it can be installed on the side.

A version for IT system connection networks is also available.

All versions are equipped with Modbus; in addition, the CANopen communication protocol can be added as an accessory.

The inverter can be installed on the motor or on the wall through its reinforced plastic base that easily adapts to all needs.

DGM0 options

Fieldbus

In the standard version, DGM0 is equipped with the RTU Modbus communication protocol, available on the same connector used for programming.

In addition, the version with the CAN open communication protocol is available on request, to extend the possibility of integration with other fieldbus.

Membrane keyboard

DGM0 is available with a membrane keyboard embedded in the cover.

The keyboard includes 6 buttons (to know the available settings, see the Instruction Manual), and two indicator LEDs.

This version is useful if you need to control the inverter in manual mode very often. Available buttons: Start, Stop, Alarm Reset, Reverse, and Selection of two different operating modes.

This version cannot be configured with an additional fieldbus.

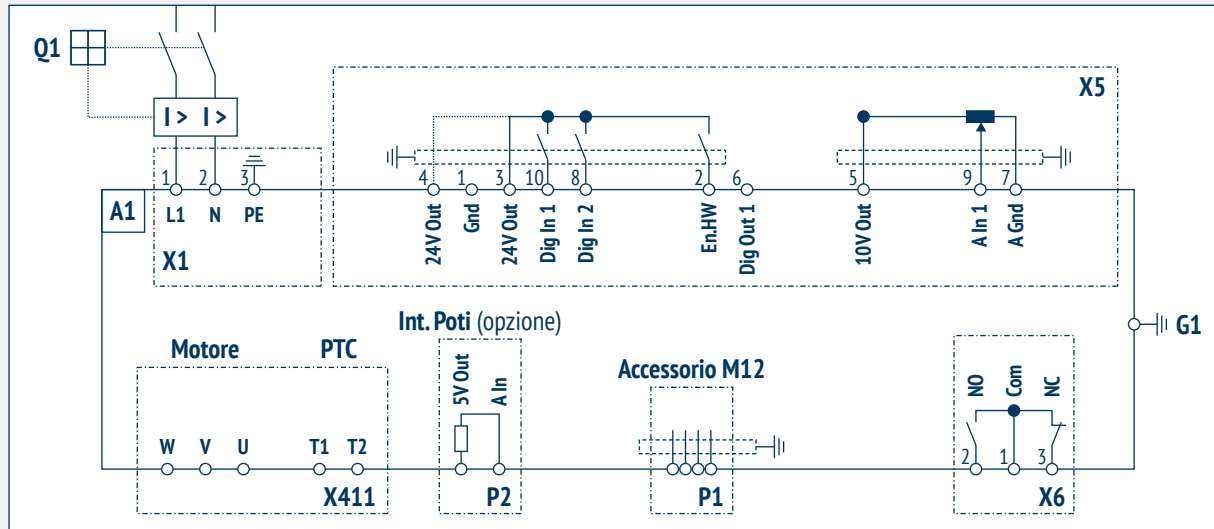
IT Network

DGM0 is also available with an IT network connection option.




DGM0 wiring diagram

Example of DGM0 version wiring:



Input/output characteristics

Name	Function
Digital inputs 1 - 2	<ul style="list-style-type: none"> Switching level - low < 5 V / high > 15 V I_{max} (a 24 V) = 3 mA R_{in} = 8,6 kΩ
Hardware enable input	<ul style="list-style-type: none"> Switching level - low < 3 V / high > 18 V I_{max} (a 24 V) = 8 mA
Analog input 1	<ul style="list-style-type: none"> In +/- 10 V or 0...20 mA In 2...10 V or 4...20 mA Resolution: 10 Bit Tolerance: +/- 2 % Voltage input: R_{in} = 10 kΩ Current input: Load = 500 Ω
Digital output 1	<ul style="list-style-type: none"> Shortcircuit protection I_{max} = 20 mA
Relay 1	<ul style="list-style-type: none"> 1 Switch-over contact (NA/NC) Maximum switching power <ul style="list-style-type: none"> - with ohmic load ($\cos \varphi = 1$): 5 A a ~ 230 V to = 30 V - with inductive load ($\cos \varphi = 0.4$): 2 A a ~ 230 V to = 30 V Maximum stepping time: 7 ms \pm 0,5 ms Electrical endurance: 100000 switching cycles
Supply voltage 24 V	<ul style="list-style-type: none"> Auxiliary voltage U = 24 Vdc Shortcircuit protection I_{max} = 100 mA
Supply voltage 10 V	<ul style="list-style-type: none"> Auxiliary voltage U = 10 Vdc Shortcircuit protection I_{max} = 30 mA

DGM1 and DGM3



DGM1 and DGM3 are the most complete solution of decentralized sensorless vector control inverters.

The DGM1 inverter is a single-phase version with power between 0.37 kW and 1.1 kW (Size A), while the DGM3 inverter is a three-phase version with power between 0.55 kW and 22 kW (Size A, B, C, D).

Both DGM1 and DGM3 can be configured in Standard or Basic version. The difference between the two lies in the number of options that can be selected, the available power range, the number of I/O and the presence of the lateral potentiometer, as detailed in the comparison table.

DGM1 and DGM3 can be installed both on the motor or on the wall, via a special aluminum adapter.

DGM1 and DGM3 options

Fieldbus

All DGM are equipped with the RTU Modbus communication protocol, available on the same connector used for programming.

In addition, the version with one of the other 5 communication protocols is available on request, to extend the possibility of integration with other fieldbus.

Based on the fieldbus selected, there will be additional M12 communication connectors on the housing.

This way, DGM can be embedded in the network chosen by the user, and communicate with the control and monitoring devices.

Wide range of the most widespread fieldbus.



DGM1 and DGM3 options

Membrane keyboard

DGM1 DGM3 are available with a membrane keyboard embedded in the cover. The keyboard features 6 programmable function buttons, 5 LED indicators and a potentiometer.

This version is ideal if you need to control the inverter in manual mode very often. Available buttons: Start, Stop, Alarm Reset, Reverse, and Selection of two different operating modes.

It cannot be configured with an additional fieldbus.

It cannot be configured with a potentiometer installed on the inverter side.



Integrated MMI

DGM1 and DGM3 are available with a programming keyboard with display embedded in the cover. This keyboard features 8 buttons and 1 display.

This version is ideal for customers with special needs; the embedded keyboard can be used to program the inverter, and display current values and alarms. As

in the Foil Keypad version, the available buttons are:

Start, Stop, Alarm Reset, Reverse, and selection of two different operating modes. Speed can be adjusted via the potentiometer installed on the side.



DGM1 and DGM3 options

STO Functional Safety

The Machine Directive defines the safety requirements for each machine. In particular, all machine movements must be controlled by a safety system that, in case of emergency, can stop the motor, switch them off and prevent their restart, until normal conditions are restored.

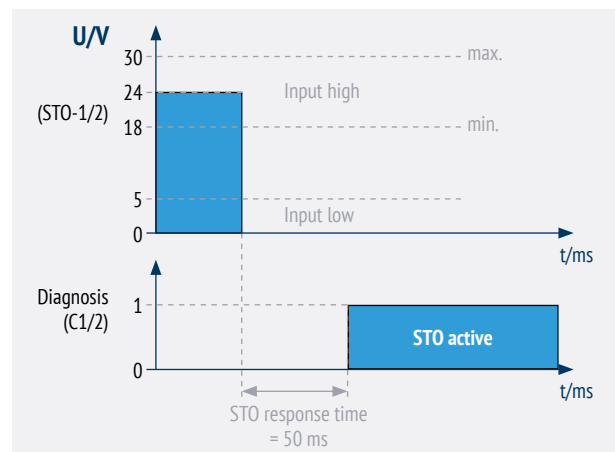
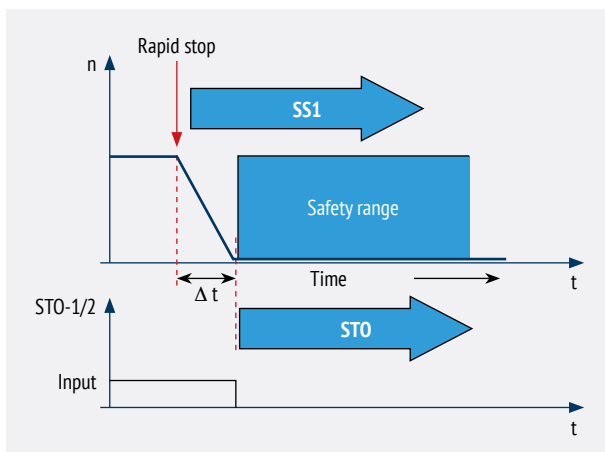
To this end, the DGM "safety variants" are equipped with the Safe Torque OFF (STO) function, in compliance with Standards SIL3 (EN IEC 62061) / PLe (EN ISO 13849-1). This function is controlled via two special redundant safety channels, each equipped with a relevant feedback.

The STO option is available for all DGM3 devices.



In the STO version, the two output relays are replaced by the two STO safety channels and related feedback contacts, while the Hardware enable of the standard version is replaced by digital input 5, used to activate the Safe Stop 1 (SS1) function (when this function is triggered, the motor is braked with the ramp set in the relevant parameter, and then secured with the STO function).

Name	Value
STO max. response time	50 ms
PELV/SELV STO channel (nominal) supply voltage	24 Vdc
PELV/SELV STO supply voltage tolerance (referred to the nominal voltage)	± 25 %
STO channel current absorption with nominal voltage	typ. 65 mA
Start-up phase peak current (2.5 ms)	400 mA
Compatibility: Max OSSD pulse	1 ms
Compatibility: Min. OSSD pulse time	10 ms
STO Input Low	0...5 Vdc
STO Input High	18...30 Vdc
STO Input High when operating with OSSD signals	19.2...30 Vdc



DGM1 and DGM3 options

Braking chopper

When speed of an inverter-controlled electric motor is reduced, the motor acts as a generator, feeding back energy to the frequency converter. The inverter link circuit voltage is increased, until it reaches a value beyond which excess power must be suitably discharged via external dissipative components.

The DGM version with Braking Chopper can support the aforementioned technique to connect a braking resistor for power thermal dissipation.

All sizes are available with the Braking Chopper option.

This version is equipped with two additional clamps (B+ and B-) that can be connected to the relevant braking resistor, whose size is based on the application dynamics.



The braking resistor to be connected to the chopper is available as accessory.

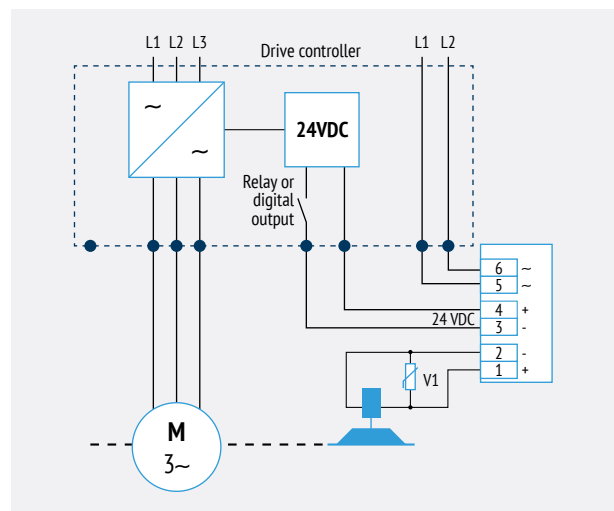
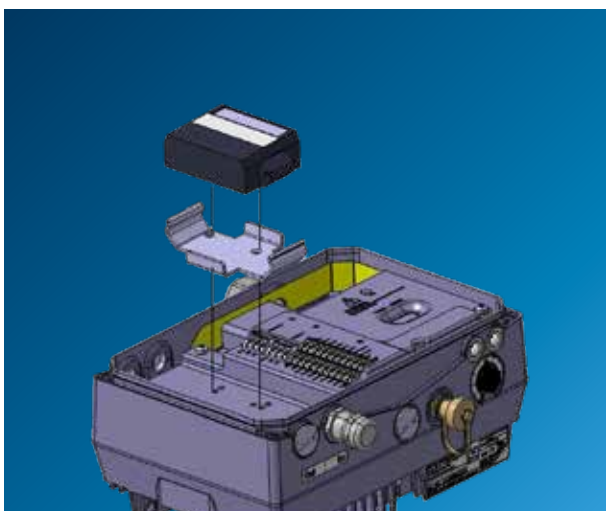
Brake rectifier module

The rectifier module - available as accessory - is used to control a brake in direct current.

The rectified module is powered with alternating voltage, and it controls the brake with direct voltage, whose value depends on the module supply voltage.

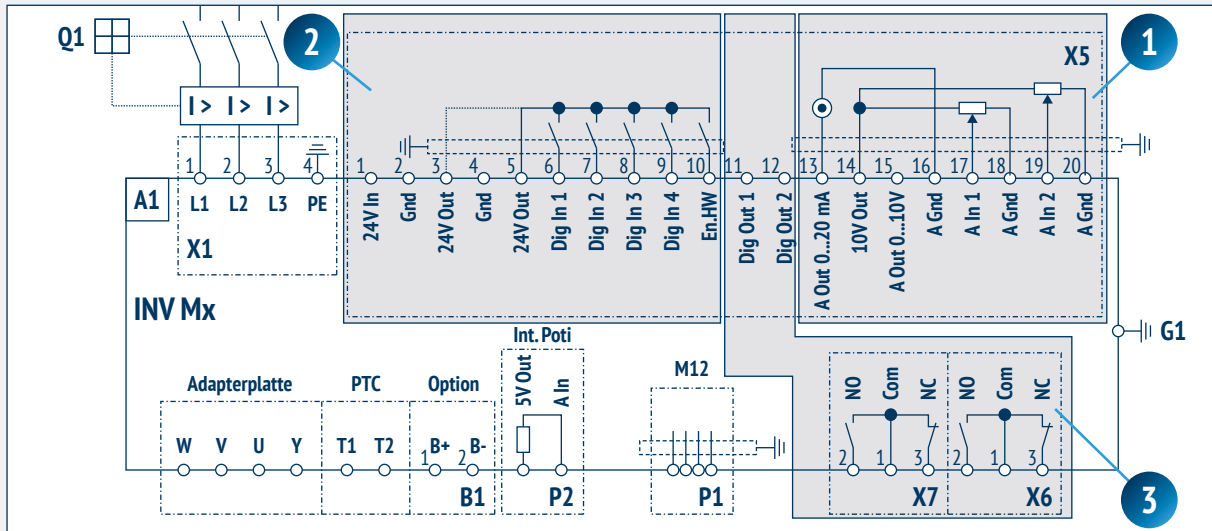
Supply voltage [Un]	Internal circuit	Brake voltage
230 Vac	Half-wave rectifier ($U_n \times 0.445$)	102 Vdc
400 Vac	Half-wave rectifier ($U_n \times 0.445$)	180 Vdc

In order to protect the brake reel against any current peaks, a varistor - to be connected in parallel to the control clamps - is supplied with the rectifier module.



DGM1 / DGM3 wiring diagram

Example of DGM3 version wiring:



Input/output characteristics

Name	Function
Digital inputs 1- 4	<ul style="list-style-type: none"> Switching level - low < 5 V / high > 15 V I_{max} (a 24 V) = 3 mA $R_{in} = 8,6 \text{ k}\Omega$
Hardware enable input	<ul style="list-style-type: none"> Switching level - Low < 3 V / High > 18 V I_{max} (a 24 V) = 8 mA
Analog inputs 1, 2	<ul style="list-style-type: none"> In +/- 10 V or 0 - 20 mA In 2 - 10 V or 4 - 20 mA Resolution: 10 Bit Tolerance: +/- 2 % Voltage input: $R_{in} = 10 \text{ k}\Omega$ Current input: Load = 500 Ω
Digital outputs 1, 2	<ul style="list-style-type: none"> Shortcircuit resistance $I_{max} = 20 \text{ mA}$
Relays 1, 2	<ul style="list-style-type: none"> 1 Switch-over contact (NO/NC) Maximum making capacity* <ul style="list-style-type: none"> - with ohmic load ($\cos \varphi = 1$): 5 A a ~ 230 V to = 30 V - with inductive load ($\cos \varphi = 0.4$): 2 A a ~ 230 V to = 30 V Maximum stepping time: 7 ms \pm 0,5 ms Electrical endurance: 100,000 switching cycles
Analog output 1 (current)	<ul style="list-style-type: none"> Shortcircuit resistance $I_{out} = 0..20 \text{ mA}$ Load = 500 Ω Tolerance: +/- 2 %
Analog output 1 (voltage)	<ul style="list-style-type: none"> Shortcircuit resistance $U_{out} = 0..10 \text{ V}$ $I_{max} = 10 \text{ mA}$ Tolerance: +/- 2 %
Supply voltage 24 V	<ul style="list-style-type: none"> Auxiliary voltage $U = 24 \text{ V dc}$ Shortcircuit resistance $I_{max} = 100 \text{ mA}$ possible external power supply 24 Vdc
Supply voltage 10 V	<ul style="list-style-type: none"> Auxiliary voltage $U = 10 \text{ V dc}$ Shortcircuit resistance $I_{max} = 30 \text{ mA}$

Selection table

Motor selection	Inverter Type	Rated Power	Control Unit	LID	Power Unit	Brake rectifier module	Accessories
Gearbox selection							
						- Without rectifier module for self-braking motors BR With brake rectifier module for self-braking motors	
					P01 Without braking arm P02 With braking arm P03 For IT networks (without braking arm)		
				L01 Standard cover L02 Standard cover + Potentiometer L03 Cover with integrated MMI L04 Cover with integrated MMI + Potentiometer L05 Cover with integrated Foil Keypad			
			C01 Basic C02 Standard C03 Standard + CANopen C04 Standard + EtherCAT C05 Standard + Profibus C06 Standard + Profinet C07 Standard + Sercos III C12 Functional Safety C13 Functional Safety + CANopen C14 Functional Safety + EtherCAT C15 Functional Safety + Profibus C16 Functional Safety + Profinet C17 Functional Safety + Sercos III				
		0025 0.25 kW 0037 0.37 kW 0055 0.55 kW 0075 0.75 kW 0110 1.1 kW 0150 1.5 kW 0220 2.2 kW 0300 3 kW 0400 4 kW 0550 5.5 kW 0750 7.5 kW 1100 11 kW 1500 15 kW 1850 18.5 kW 2200 22 kW					
	DGM0 Entry Level DGM1 Single-phase DGM3 Three-phase						

Version comparison

	DGM0	DGM1 / DGM3	DGM1 / DGM3
	Standard	Basic	Standard
Nominal power	0.25... 0.75 kW	0.37... 7.5 kW	0.37... 22 kW
Digital inputs	2	2	4
Digital outputs	1	1	2
Output relays	1	-	2
Analog inputs (configurable as digital inputs)	1	1	2
Analog outputs	-	-	1
Internal 24 Vdc	●	●	●
External 24 Vdc	-	-	●
Motor temperature probe clamps	-	●	●
Potentiometer	●	-	●
Foil Keypad embedded in the cover	● ⁽²⁾	● ^{(1) (2)}	● ^{(1) (2)}
MMI embedded in the cover	-	●	●
Modbus	●	●	●
CANopen	● ⁽²⁾	-	● ⁽²⁾
Profibus	-	-	● ⁽²⁾
Profinet	-	-	● ⁽²⁾
EtherCAT	-	-	● ⁽²⁾
Sercos III	-	-	● ⁽²⁾
Safe Torque Off (STO)	-	-	● ⁽³⁾
Braking chopper	-	●	●
IT Network	●	-	-
PID	●	●	●
Vplus Dec	●	●	●
Internal PLC	●	●	●
Programming cable	●	●	●
Brake control rectifier	-	-	●
Hand-held MMI	●	●	●

- Available as standard feature
- Available as option
- Available as accessory

- (1) Potentiometer and Foil Keypad cannot be selected at the same time
 (2) Foil Keypad and optional fieldbus cannot be selected at the same time
 (3) For three-phase version only

Rules and compatibility

DGM0 Compatibility with Bonfiglioli Motors

Compatibility table to install the inverter on the motor, based on the mounting arrangement.

4 poles		BN BN CUS	BE BE CUS	BX	BX CUS	M M CUS	ME ME CUS	MX MX CUS
		IE1	IE2	IE3		IE1	IE2	IE3
Pn [kW]	0.25	63C				05C		
		71A				05C		
	0.37	71B				1SD		
	0.55	71C				1LA		
	0.75	80B	80B	80B	90SR	2SA	2SB	2SB

DGM1 and DGM3 Compatibility with Bonfiglioli Motors

Compatibility table to install the inverter on the motor, based on the mounting arrangement.

4 poles		BN BN CUS	BE BE CUS	BX	BX CUS	M M CUS	ME ME CUS	MX MX CUS	
		IE1	IE2	IE3		IE1	IE2	IE3	
Pn [kW]	0.37	71B				1SD			
	0.55	71C				1LA			
		80A				1LA			
	0.75	80B	80B	80B			2SA	2SB	2SB
					90SR				
	1.1	80C							
		90S	90S	90S	90S	90S	2SB	3SA	3SA
	1.5	90LA	90LA	90LA	90LA	90LA	3SA	3SB	3SB
	2.2	100LA	100LA	100LA	100LA	100LA	3LA	3LA	3LA
	3	100LB	100LB	100LB	100LB	100LB	3LB	3LB	3LB
	4	112M	112M	112M	112M	112M	3LC		
	5.5	132S	132S	132SB	132SB	132SB	4SA	4SB	4SB
	7.5	132MA	132MA	132MA	132MA	132MA	4LA	4LA	4LA
	11		160M	160MB	160MB	160MB		5SA	5SB
	15	160L	160L	160L	160L	160L	5SB	5LA	5LA
	18.5	180M	180M	180M	180M	180M	5LA		
22	180L	180L	180L	180L	180L				

Rules and compatibility

DGM Compatibility with Motor Options

Brake with alternating current	FA	Not compatible
Motor with handwheel	F1	Not compatible
Motor with connectors	CON	Not compatible
Additional cables input	IC	Not compatible
Servofan with separate terminal box	U1	For some mounting arrangements and based on the FD brake presence, the servofan must be rotated by 90°. because the terminal box footprint would interfere with the inverter footprint
Servofan with terminal box in the motor box	U2	Not compatible
Brake release lever	R and RM	No AA position installation
Anti-condensation heaters	H1 and NH1	Not compatible with Size D
Brake microswitch	MSW	For Size D, the microswitch cable cannot be inserted in the motor box; the user must connect it in a suitable box

Accessories

MMI Interface

Apart from the VPlus Dec PL software, DGM can also be programmed via the MMI keypad with display. With MMI, you can commission, change and save the parameters and perform troubleshooting operations.



With this control device, users can write and display all DGM parameters. Parameters can be downloaded from an inverter to the MMI and copied on another inverter. On the MMI, you can save up to 8 complete data sets, control the inverter manually or check the actual and saved alarms. The hand-held MMI control device is connected to the inverter integrated interface. No external signals or power supply required. The keypad is supplied with a 3 meter spiral cable, RJ9 connector and M12 connector.

Communication cable

To connect it with the VPlus Dec programming software, use the special communication cable available as accessory. 2 meter communication cable with USB connector on one side and M12 connector on the other, with integrated 485 converter.



Technical data

		DGM0 (230 Vac)				
Electric data	Size		0			
	Input current	[A]	4.5	4.5	5.8	7.3
	Nominal output current, act. (a 8kHz)	[A]	1.4	2.2	2.7	3.3
	Min. braking chopper	[Ω]	-			
	60 sec. overload	[%]	150			
	Switching frequency	[kHz]	4, 8 (default), 16			
	Output frequency	[Hz]	0 ÷ 400			
	Network start / reconnecting cycles		Every 2 min			
	Braking module		-			
Contact current DIN EN 61800-5		< 10 mA				
Functions	Protection functions	Overvoltage and undervoltage, I ² t limitation, shortcircuit, ground fault, motor and inverter temperature, tilting prevention, block detection, dry PID cycle protection				
	Software functions	Process control (PID), fixed frequencies, dataset switching, quick restart, motor current limitation				
	Soft PLC	IEC61131-3, FBD, ST, AWL				
	Safe Torque Off (STO) function	-				
Mechanical data	Housing	Plastic adapter plate / Die-cast aluminum housing				
	Size (L x W x H)	[mm]	187x126x70	187x126x80		
	Weight, inc. adapter plate	[kg]	1.5			
	Degree of protection		IP65			
	Cooling		Passive			
Environmental conditions	Room temperature	-10°C (without condensation)...+40°C (+50°C with derating)				
	Storage temperature	-25 °C... +85 °C				
	Installation altitude	up to 1000m s.l.m. / higher than 1000m with reduced power (1% every 100m) / higher than 2000m see the Instruction Manual				
	Air relative humidity	≤ 96% no condensation allowed				
	Vibration resistance (DIN EN 60068-2-6)	50m/s ² ; 5... 200 Hz				
	Impact resistance (DIN EN 60068-2-27)	300m/s ²				
	EMC (DIN EN 61800-3)	C2				
Interfaces	I/O interfaces	2 DI / 1 DO / 1 AI / 2 Relays				
	Internal power supply	24Vdc, 100mA / 10Vdc, 30mA / shortcircuit protection				
	External power supply 24 Vdc	-				
	Embedded fieldbus	Modbus RTU				
	Optional fieldbus	CANopen				
	Status LED	2 LEDs (1 red, 1 green)				
	Certificates of conformity	ROHS, CE, UL, CSA				

Technical data

		DGM1 (230 Vac)				
Electric data	Size		A			
	Electric systems		TN/TT			
	Input current	[A]	4.5	5.6	6.9	9.2
	Nominal output current, act. (a 8kHz)	[A]	2.3	3.2	3.9	5.2
	Min. braking chopper	[Ω]	50			
	60 sec. overload	[%]	150			
	Switching frequency	[kHz]	4, 8 (default), 16			
	Output frequency	[Hz]	0 ÷ 400			
	Network start / reconnecting cycles		Every 2 min			
	Braking module		Un 230Vac / Ufreno 102Vdc Un 400Vac / Ufreno 180Vdc			
Contact current DIN EN 61800-5		< 10 mA				
Functions	Protection functions		Overvoltage and undervoltage, I ² t limitation, shortcircuit, ground fault, motor and inverter temperature, tilting prevention, block detection, dry PID cycle protection			
	Software functions		Process control (PID), fixed frequencies, dataset switching, quick restart, motor current limitation			
	Soft PLC		IEC61131-3, FBD, ST, AWL			
	Safe Torque Off (STO) function		Not available			
Mechanical data	Housing		Die-cast aluminum housing			
	Size (L x W x H)	[mm]	233x153x120			
	Weight, inc. adapter plate	[kg]	3.9			
	Degree of protection		IP65			
Environmental conditions	Cooling		Passive			
	Room temperature		-10°C (without condensation)...+40°C (+50°C with derating)			
	Storage temperature		-25 °C... +85 °C			
	Installation altitude		up to 1000m s.l.m. / higher than 1000m with reduced power (1% every 100m) / higher than 2000m see the Instruction Manual			
	Air relative humidity		≤ 96% no condensation allowed			
	Vibration resistance (DIN EN 60068-2-6)		50m/s ² ; 5... 200 Hz			
	Impact resistance (DIN EN 60068-2-27)		300m/s ²			
	EMC (DIN EN 61800-3)		C1			
Interfaces	I/O interfaces		4 DI/2 DO/2 AI/1 AO/2 RELAY/1 IN PTC			
	Internal power supply		24Vdc, 100mA / 10Vdc, 30mA / shortcircuit protection			
	External power supply 24 Vdc		24 Vdc ± 15%			
	Embedded fieldbus		Modbus RTU			
	Optional fieldbus		CANopen, ProfiBUS, ProfiNET, EtherCAT, Sercos III			
	Status LED		2 LEDs (1 red, 1 green)			
	Certificates of conformity		ROHS, CE, UL, CSA			

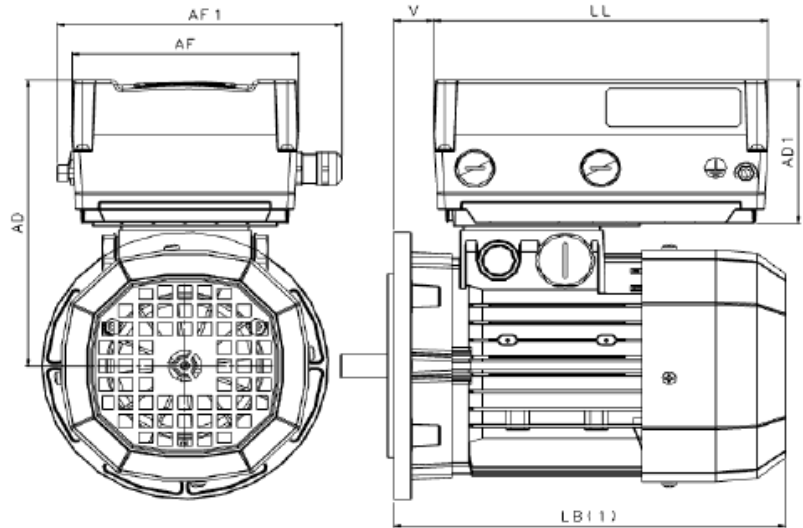
Technical data

		DGM3 (400 Vac)																
		A				B				C				D				
Electric data	Size																	
	Connected motor power	[kW]	0.55	0.75	1.1	1.5	2.2	3.0	4.0	5.5	7.5	11.0	15.0	18.5	22.0			
	Network voltage		3 x 200 Vac -10%... 480 Vac +10% 280 Vdc -10%... 680 Vdc +10%															
	Network frequency		50/60 Hz ± 6%															
	Electric systems		TN/TT															
	Input current	[A]	1.4	1.9	2.6	3.3	4.6	6.2	7.9	10.8	14.8	23.2	28.2	33.2	39.8			
	Nominal output current, act. (a 8kHz)	[A]	1.7	2.3	3.1	4.0	5.6	7.5	9.5	13.0	17.8	28.0	34.0	40.0	48.0			
	Min. braking chopper	[Ω]	100				50				50				30			
	60 sec. overload	[%]	150															
	Switching frequency	[kHz]	4, 8 (default), 16															
	Output frequency	[Hz]	0 ÷ 400															
	Network start / reconnecting cycles		Every 2 min															
	Braking module		Un 230Vac / Ufreno 102Vdc Un 400Vac / Ufreno 180Vdc															
	Contact current DIN EN 61800-5		< 3.5 mA															
Functions	Protection functions		Overvoltage and undervoltage, I ² t limitation, shortcircuit, ground fault, motor and inverter temperature, tilting prevention, block detection, dry PID cycle protection															
	Software functions		Process control (PID), fixed frequencies, dataset switching, quick restart, motor current limitation															
	Soft PLC		IEC61131-3, FBD, ST, AWL															
	Safe Torque Off (STO) function		2 x STO inputs															
Mechanical data	Housing		Die-cast aluminum housing															
	Size (L x W x H)	[mm]	233x153x120				270x189x140				307x223x181				414x294x232			
	Weight, inc. adapter plate	[kg]	3.9				5.0				8.7				21.0			
	Degree of protection		IP65										IP65 (IP55 Cooling fans)					
Environmental conditions	Cooling		Passive										Active (2 fans)					
	Room temperature		-25°C (without condensation)...+50°C (without derating)															
	Storage temperature		-25 °C... +85 °C															
	Installation altitude		up to 1000m s.l.m./ higher than 1000m with reduced power (1% every 100m) / higher than 2000m see the Instruction Manual															
	Air relative humidity		≤ 96% no condensation allowed															
	Vibration resistance (DIN EN 60068-2-6)		50m/s ² ; 5... 200 Hz															
	Impact resistance (DIN EN 60068-2-27)		300m/s ²															
Interfaces	EMC (DIN EN 61800-3)		C2															
	I/O interfaces		4 DI/2 DO/2 AI/1 AO/2 RELAYS (The STO version includes 2 STO channels and no relays)/1 IN PTC															
	Internal power supply		24Vdc, 100mA / 10Vdc, 30mA / shortcircuit protection															
	External power supply 24 Vdc		24 Vdc ± 15%															
	Embedded fieldbus		Modbus RTU															
	Optional fieldbus		CANopen, ProfiBUS, ProfiNET, EtherCAT, Sercos III															
	Status LED		2 LEDs (1 red, 1 green)															
Certificates of conformity		ROHS, CE, UL, CSA																

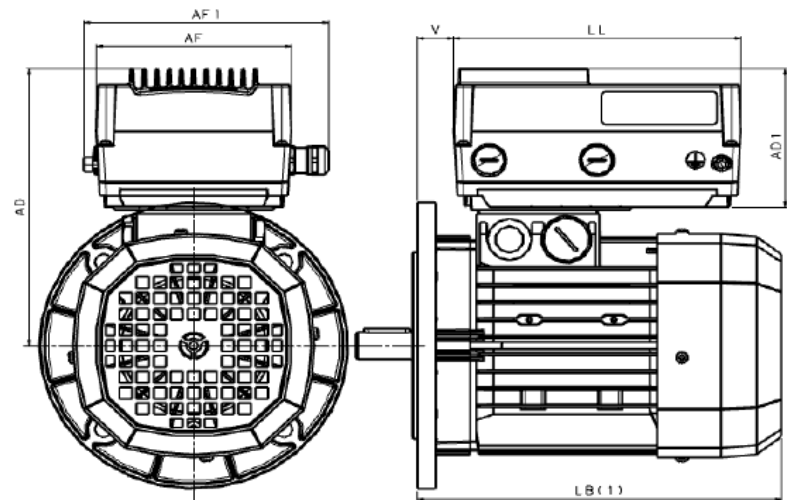
Size data

DGM0 Size with BN, BE, BX Motors

Inverter version without flaps
(Power 0.25/0.37)



Inverter version with flaps
(Power 0.55/0.75)



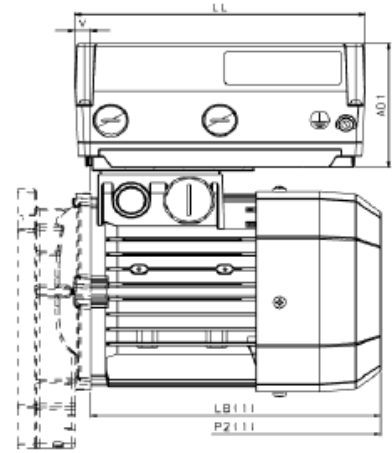
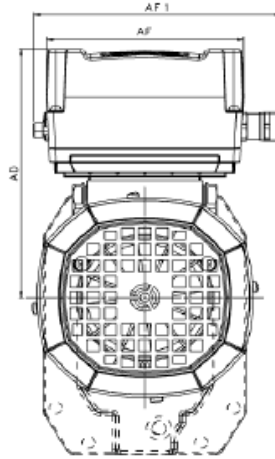
DGM inverter		Motor (4 poles)				Size					
Power (kW)	Size	BN	BE	BX	BX CUS	AD	AD1	AF	AF1	LL	V
0.25	0	63C	-	-	-	158 ⁽²⁾	86	126	159	186	12
		71A	-	-	-	171 ⁽²⁾					
71B		-	-	-	171 ⁽²⁾						
0.37		71C	-	-	-	182 ⁽³⁾	97				
0.55		80A	-	-	-	194 ⁽³⁾					
		80B	80B	80B	-	194 ⁽³⁾					
0.75	-	-	-	90SR	198 ⁽³⁾						30

(1) Length LB and all the other measurements not included are the same as the standard motors.
 (2) Inverter version without flaps
 (3) Inverter version with flaps

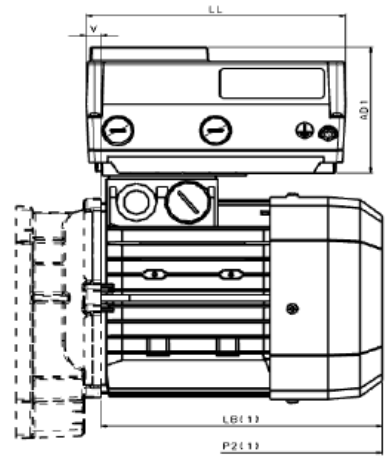
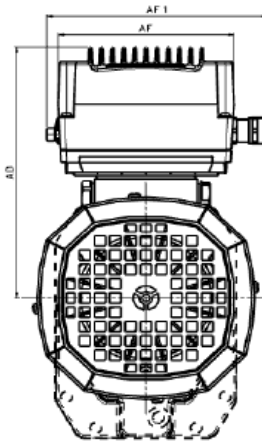
Size data

DGM0 Size with M, ME, MX Motors

Inverter version without flaps
(Power 0.25/0.37)



Inverter version with flaps
(Power 0.55/0.75)



DGM inverter		Motor (4 poles)				Size					
Power (kW)	Size	BN	BE	BX	BX CUS	AD	AD1	AF	AF1	LL	V
0.25	0	05C	-	-	-	158 ⁽²⁾	86	126	159	186	6
0.37		1SD	-	-	-	171 ⁽²⁾					10
0.55		1LA	-	-	-	180 ⁽³⁾	97				10
0.75		2SA	2SB	2SB	-	194 ⁽³⁾					11
		-	-	-	2SB	198 ⁽³⁾					12 ⁽⁴⁾

(1) Length LB (MOTOR), P2 (GEARMOTOR) and all the other measurements not included are the same as the standard motors.

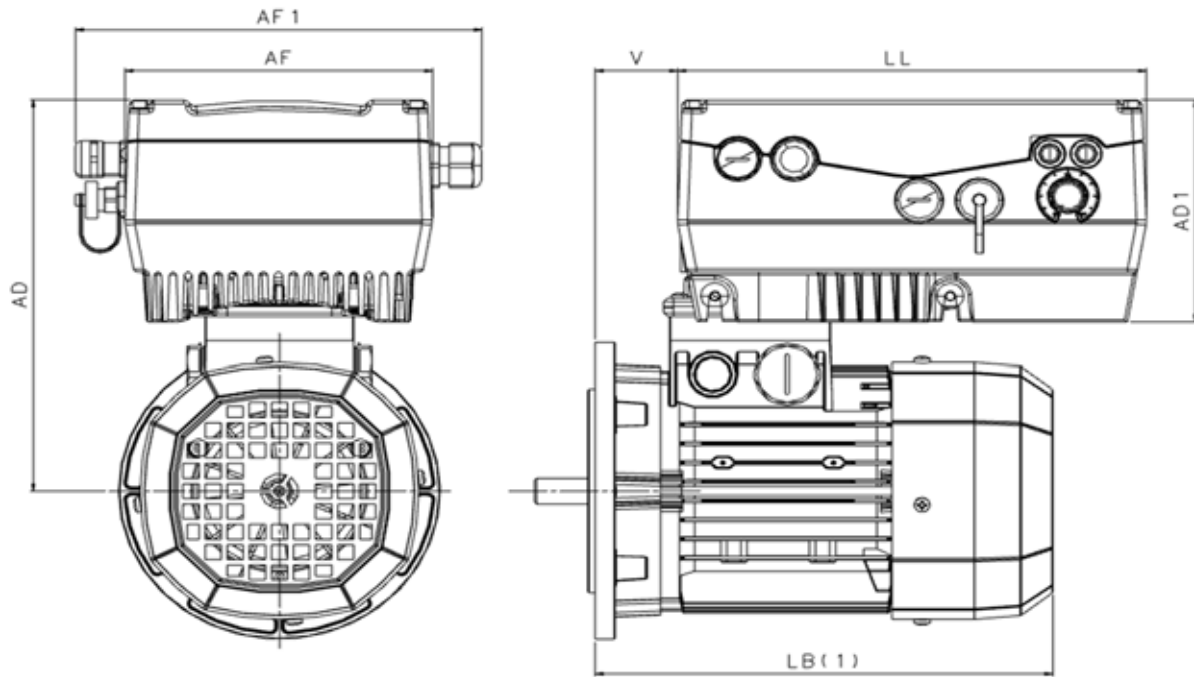
(2) Inverter version without flaps

(3) Inverter version with flaps

(4) The motor casing surface overhangs from the inverter

Size data

DGM1/DGM3 Size with BN, BE, BX Motors



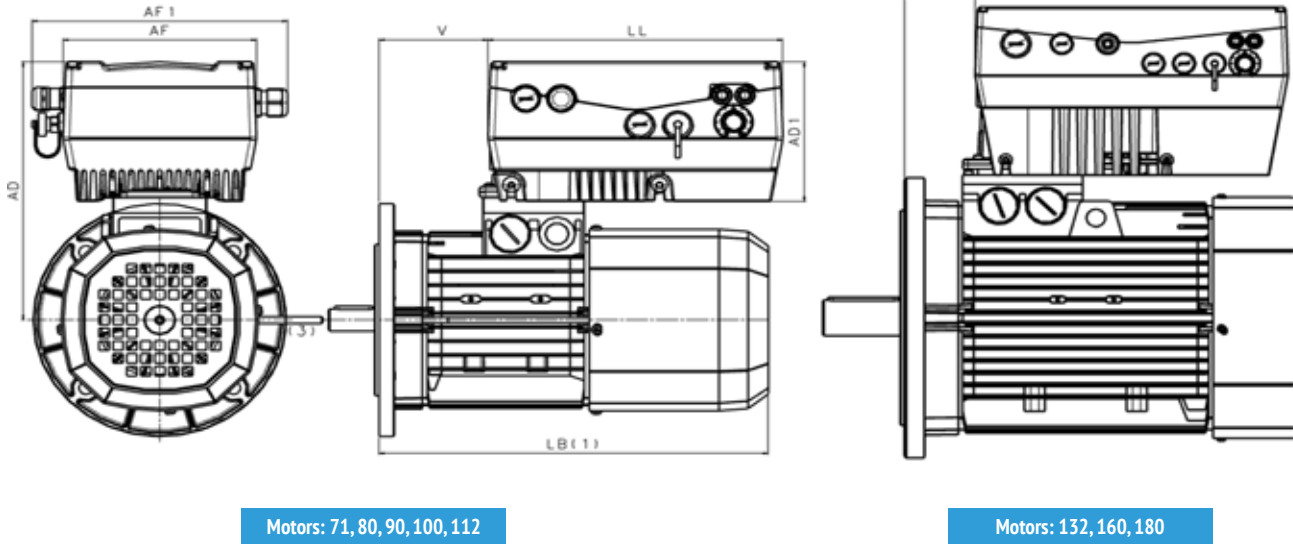
DGM inverter		Motor				Size					
Power (kW)	Size	BN	BE	BX	BX CUS	AD	AD1	AF	AF1	LL	V
0.37	A	71B	-	-	-	211	120	153	202	233	41
0.55		71C	-	-	-	211					41
		80A	-	-	-	222					42
0.75		80B	80B	80B	-	222					42
		-	-	-	90SR	234					57 ⁽²⁾
1.1		80C	-	-	-	222					42
		90S	90S	90S	90S	234					57
1.5		90LA	90LA	90LA	90LA	234					57
2.2	B	100LA	100LA	100LA	100LA	257	140	189	239	270	63
3		100LB	100LB	100LB	100LB	257					63
4		112M	112M	112M	112M	271					64
5.5	C	132S	132S	132SB	132SB	333	180	223	274	307	69
7.5		132MA	132MA	132MA	132MA	333					69
11	D	-	160M	160MB	160MB	406	232	294	369	414	57
15		160L	160L	160L	160L	406					57
18.5		180M	-	-	-	406					57
		-	180M	180M	180M	423					58
22		180L	180L	180L	180L	423					58

(1) Length LB and all the other measurements not included are the same as the standard motors.

(2) Value for B14 and B3 versions; for the B5 version, value V = 70 mm.

Size data

DGM1/DGM3 Size with BN_FD Motors



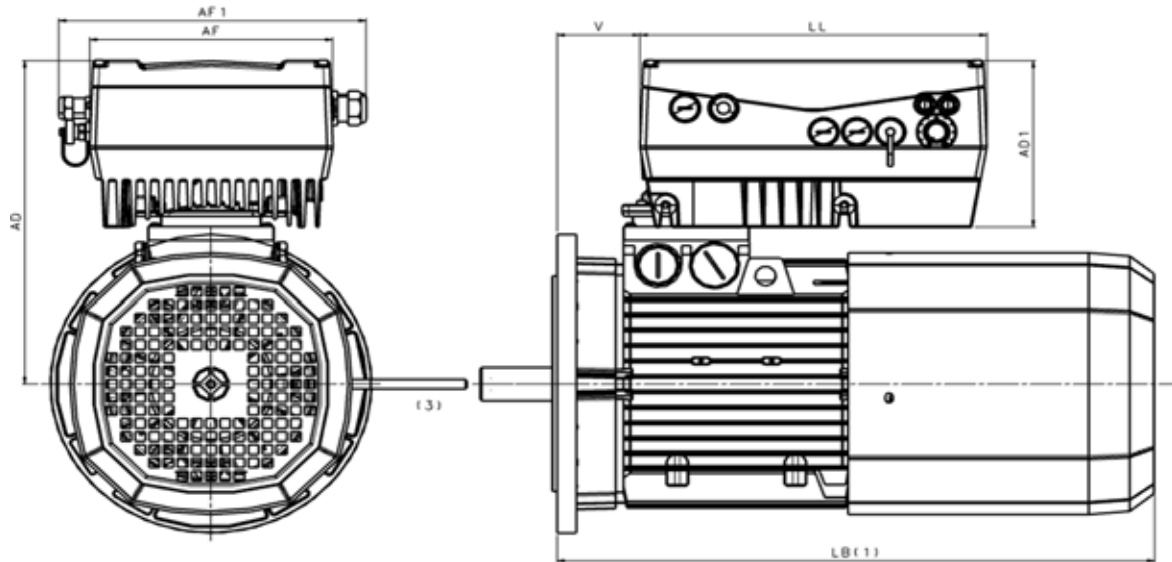
DGM inverter		Motor	Size						
Power (kW)	Size	BN	AD	AD1	AF	AF1	LL	V	
0.37	A	71B	211					69	
0.55		71C	211					69	
		80A	222					86	
0.75		80B	222					86	
		-	234	120		153	202	233	107 ⁽²⁾
1.1			80C	222					86
			90S	234					107
1.5		90LA	234					107	
2.2	B	100LA	257					131	
3		100LB	257	140		189	239	270	131
4		112M	271						142
5.5	C	132S	333					69	
7.5		132MA	333	180		223	274	307	69
11	D	160M	406					57	
15		160L	406					57	
18.5		180M	406	232		294	369	414	57
		-	423						58
22		180L	423						58

(1) Length LB and all the other measurements not included are the same as the standard motors.

(2) Value for B14 and B3 versions; for the B5 version, value V = 120 mm.

Size data

DGM1/DGM3 Size with BX_FD Motors



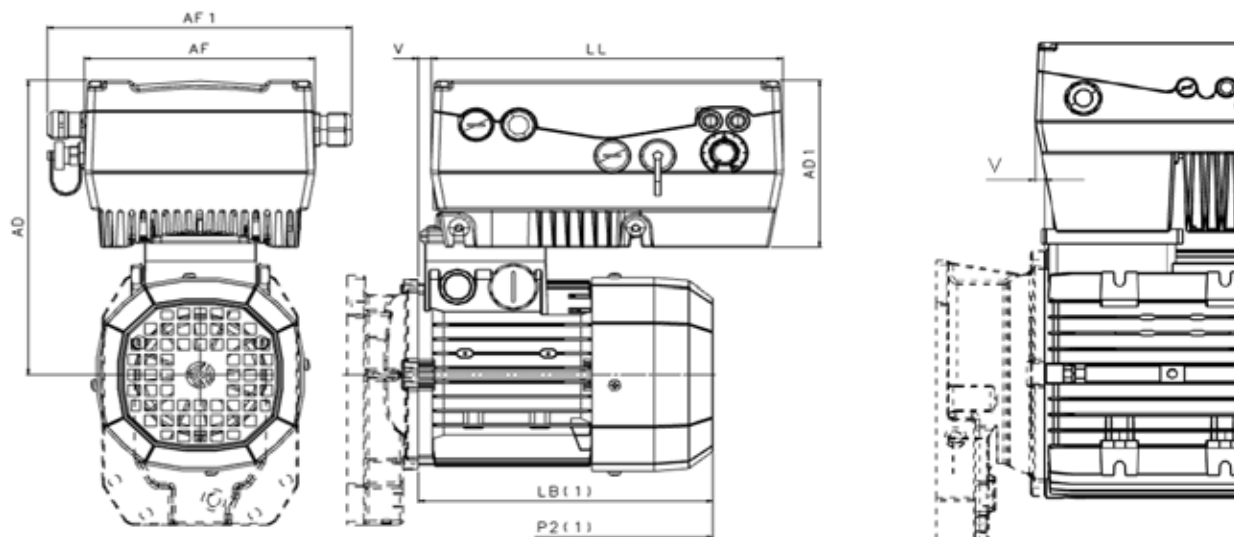
DGM inverter		Motor		Size					
Power (kW)	Size	BX	BX CUS	AD	AD1	AF	AF1	LL	V
0.75	A	80B	-	222	120	153	202	233	42
		-	90SR	234					57 ⁽²⁾
		90S	90S	234					57
1.5		90LA	90LA	234					57
2.2	B	100LA	100LA	257	140	189	239	270	63
3		100LB	100LB	257					63
4		112M	112M	271					64
5.5	C	132SB	132SB	333	180	223	274	307	69
7.5		132MA	132MA	333					69
11	D	160MB	160MB	406	232	294	369	414	57
15		160L	160L	406					57
18.5		-	-	406					57
		180M	180M	423					58
22		180L	180L	423					58

(1) Length LB and all the other measurements not included are the same as the standard motors.

(2) Value for B14 and B3 versions; for the B5 version, value V = 70 mm.

Size data

DGM1/DGM3 Size with M, ME, MX Motors



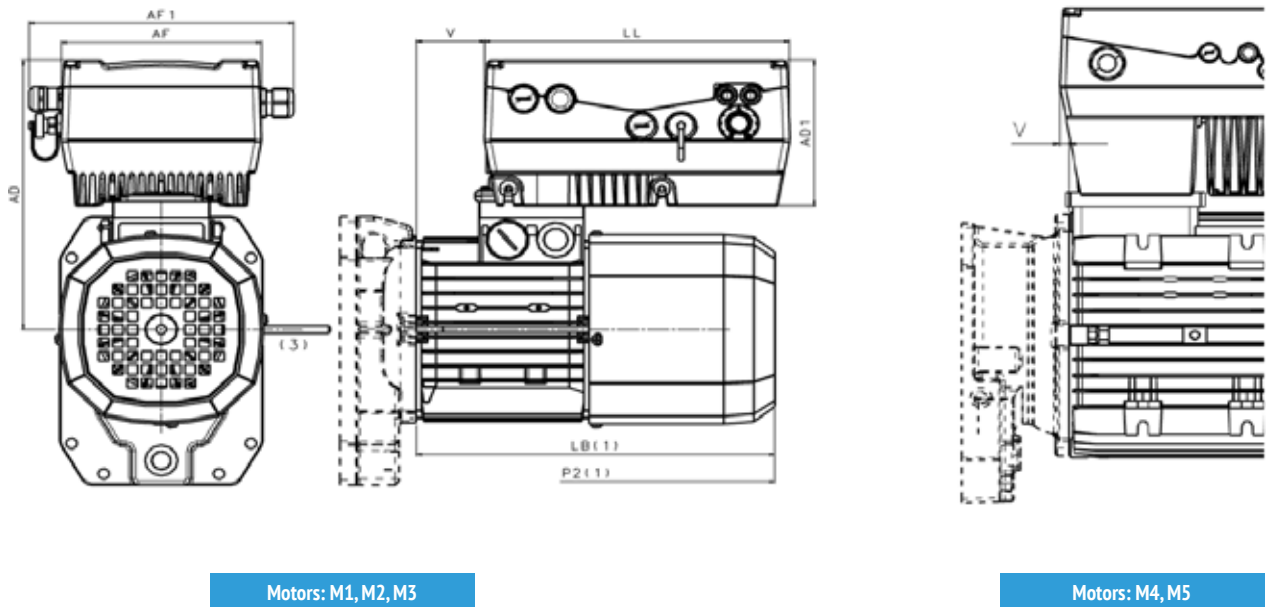
Motors: 5S/5L

DGM inverter		Motor				Size					
Power (kW)	Size	M	ME	MX	MX CUS	AD	AD1	AF	AF1	LL	V
0.37	A	1SD	-	-	-	211	120	153	202	233	8.5
0.55		1LA	-	-	-	211					8.5
0.75		2SA	2SB	2SB	-	222					8
		-	-	-	2SB	234					35.5
1.1		2SB	-	-	-	222					8
		-	3SA	3SA	3SA	257					19
1.5	B	3SA	3SB	3SB	3SB	257	140	189	239	270	19
2.2		3LA	3LA	3LA	3LA	257					19
3		3LB	3LB	3LB	3LB	257					19
4		3LC	-	-	-	257					19
5.5	C	4SA	4SB	4SB	4SB	333	180	223	274	307	16.5
7.5		4LA	4LA	4LA	4LA	333					16.5
11	D	-	5SA	5SB	5SB	406	232	294	369	414	10.5
15		5SB	5LA	5LA	5LA	406					10.5
18.5		5LA	-	-	-	406					10.5

(1) Length LB (motor), P2 (gearmotor) and all the other measurements not included are the same as the standard motors.

Size data

DGM1/DGM3 Size with M_FD Motors

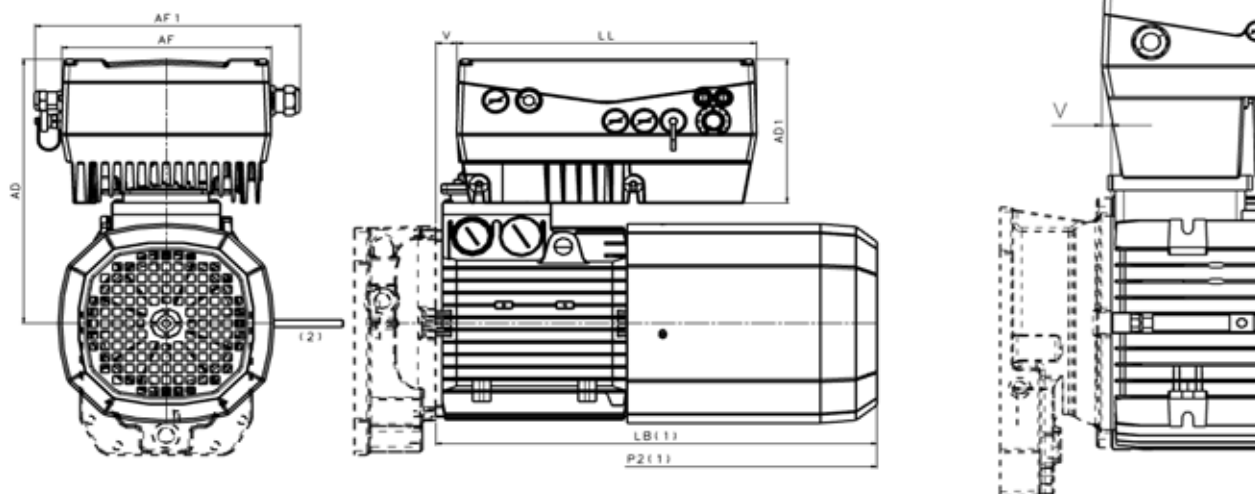


DGM inverter		Motor	Size					
Power (kW)	Size	M	AD	AD1	AF	AF1	LL	V
0.37	A	1SD	211					36
0.55		1LA	211					36
0.75		2SA	222	120	153	202	233	52
1.1		2SB	222					52
1.5		3SA	257					67
2.2	B	3LA	257					67
3		3LB	257	140	189	239	270	67
4		3LC	257					67
5.5	C	4SA	333	180	223	274	307	16.5
7.5		4LA	333					16.5
11	D	-	406					10.5
15		5SB	406	232	294	369	414	10.5
18.5		5LA	406					10.5

(1) Length LB (motor), P2 (gearmotor) and all the other measurements not included are the same as the standard motors.

Size data

DGM1/DGM3 Size with MX_FD Motors



Motors: MX5

DGM inverter		Motor		Size					
Power (kW)	Size	MX	MX CUS	AD	AD1	AF	AF1	LL	V
0.75	A	2SB	-	222	120	153	202	233	8
		-	2SB	234					35.5
3SA		3SA	257	19					
3SB		3SB	257	19					
2.2	B	3LA	3LA	257	140	189	239	270	19
3		3LB	3LB	257					19
4		-	-	257					19
5.5	C	4SB	4SB	333	180	223	274	307	16.5
7.5		4LA	4LA	333					16.5
11	D	5SB	5SB	406	232	294	369	414	10.5
15		5LA	5LA	406					10.5

(1) Length LB (motor), P2 (gearmotor) and all the other measurements not included are the same as the standard motors.

Standards and regulations

EN 61800-5-1 (2007)	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
EN 61800-3 (2004/A1:2012)	Adjustable speed electrical power drive systems. EMC requirements and specific test methods
EN 50581 (2012)	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 61800-5-2 (2007)	Adjustable speed electrical power drive systems - Part 5-2: Safety
EN 62061 (2005/A1:2013/AC:2010)	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1 (2008/AC:2009)	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2006)
IEC 61508-1(2010-04)	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements
IEC 61508-2 (2010-04)	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems

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With a broad and extensive presence in 22 countries and 5 continents, Bonfiglioli is one of the international market leaders. Our organization makes the most of geographic proximity to offer complete solutions combining efficiency and competence.



3700
EMPLOYEES



20
BRANCHES



14
PLANTS



550
DISTRIBUTORS



80
COUNTRIES

We Are a Global Company

Thanks to an international network of sales branches and closely interconnecting production plants, we can guarantee the same high standards of Bonfiglioli quality anywhere at any given time. Aware that our direct presence in local markets is the key to long-lasting success, our family includes 20 sales branches, 14 production plants and more than 500 distributors around the world.

Our organization is always close by, offering complete and efficient solutions and supporting our customers with dedicated services, such as co-engineering or after-sales assistance.



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We have a relentless commitment to excellence, innovation and sustainability. Our team creates, distributes and services world-class power transmission and drive solutions to keep the world in motion.

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