

MGE MOTORS

0.25 - 22 kW



GRUNDFOS PUMPS WITH IE5 MOTORS

– IN A CLASS OF THEIR OWN

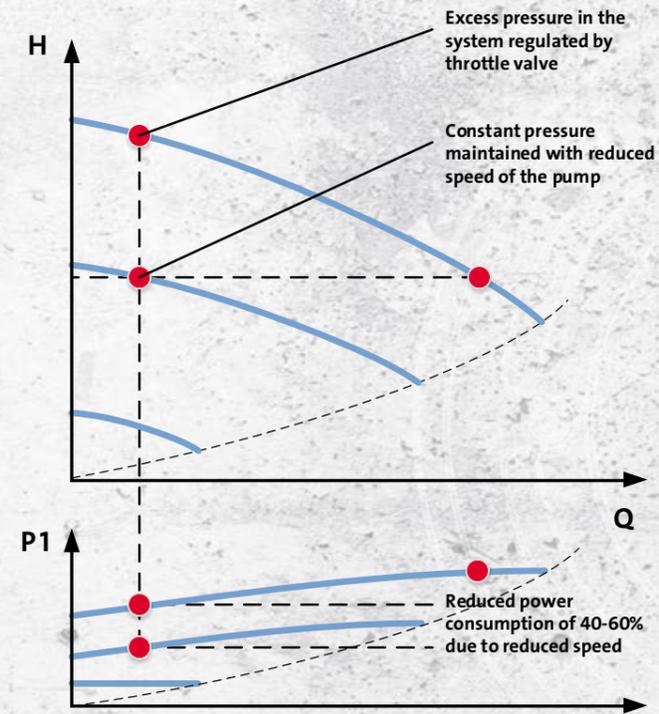
As a world leading manufacturer of pumps and pump equipment, we make electrical motors of exceptional quality.

For decades, we have been manufacturing our own motors with integrated frequency converters that match the very high standard of our electronic controlled pumps in building services, industry and water supply applications. With the IE5 motors from Grundfos you can benefit from the highest efficiency level for electrical motors.



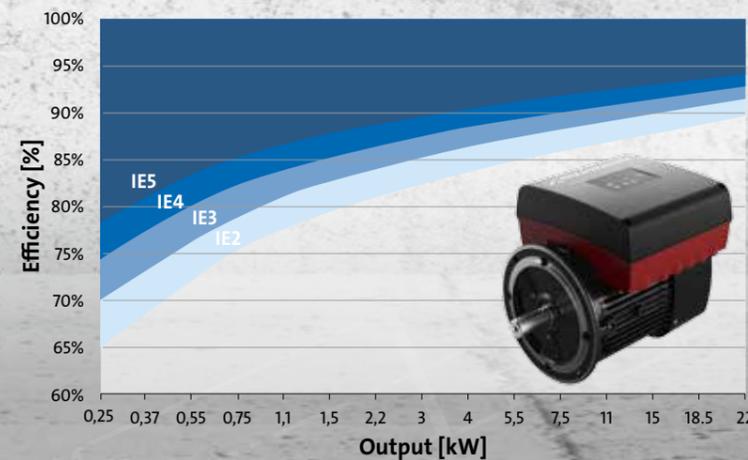
ENERGY AND COST SAVINGS WITH OPTIMISED EFFICIENCY

The Grundfos MGE motors model H/I/J are the most energy efficient yet. These permanent magnet synchronous motors (PMSM) are designed especially for frequency converter operations and optimised for pump applications and high part-load efficiency. This results in a lower energy and lifecycle costs and meet IE5 according to IEC 60034-30-2. Typically IE5 motors will achieve 10% energy savings and 25% reduction in payback compared to IE3 motors.



Adjusting the speed of the pump based on demand, rather than throttling the system flow with a valve, results in:

- No excess pressure causing stress in the system and noise in the valve due to cavitation
- Reduced power consumption due to lower pump speed.



High efficiency components, variable speed control, lower energy consumption, compact design, and additional control features make integrated E-motors the right choice for your system.

PRESSURE BOOSTING WITH HYDRO MULTI-E

A system consisting of two CRE pumps with 7,5kW MGE motors operating a given profile shows that the annual energy consumption is reduced by more than 6% or 125€ per year – **compared with previous MGE motor** – (at 12 cents/kWh).

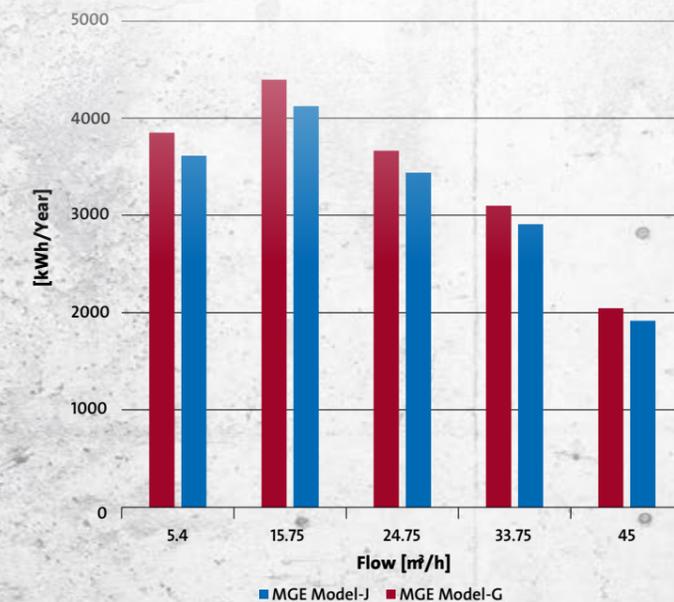
- The Multi-pump cascade function makes it possible to control up to four parallel-coupled pumps without the need for an external controller.
- Multi master concept means if a pump fails then another pump will automatically take control of the system without disturbing the system pressure.
- Communication between the motors can be done by either GENlair (wireless radio) or GENlink (wired).
- Each pump has BMS inputs/outputs (Per pump - 2 x Digital inputs, 2 x Digital outputs, 1 x Analog Output)



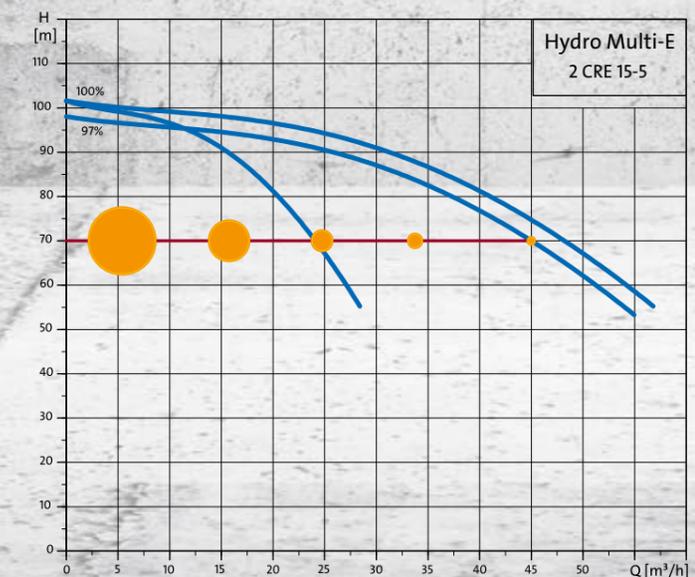
The efficiency improvements in the latest generation of MGE motors also apply at part-load. In a typical pump system the operating time at full load is fractional. This makes it possible to establish a typical energy profile so you can more accurately estimate the annual energy consumption.

The new MGE motor can shorten the payback time of the E-pump by up to 1-year compared with previous MGE, IE3 or IE2 motors with frequency converters as mandated in EU.

Annual energy consumption per duty point



Energy profile with time fraction at each part load operating point





PLUG-AND-PUMP INTEGRATION

The Grundfos E-motor with a built-in frequency converter that enables variable-speed operation with the following benefits in pump applications:

- energy savings
- process control
- extra functionalities
- built-in motor protection
- higher performance and more compact pumps
- reduced water hammer due to long ramp times
- low starting currents

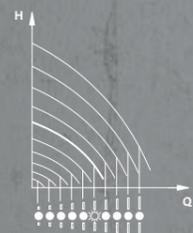
WHY CHOOSE AN E-MOTOR ?

E-motors provide a range of benefits over standard motors such as:

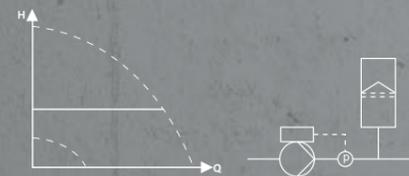
- The motor and frequency converter are perfectly matched for trouble-free operation.
- Reduced CAPEX in installed components and wiring costs.
- Purchase the complete system through Grundfos for easy customer service.
- Dedicated functionality for specific pump applications – no further programming required.
- Predefined intelligent control modes such as constant pressure, proportional pressure, and constant level, make it easy to fit the pump into any application.
- Meets EMC standards making it suitable for residential purpose buildings – without an intermediate transformer.
- Wide variety of motor mounting with flanges / shafts / feet all according to IEC and NEMA standards – customised combinations can be delivered as required.
- High operating temperature with up to IP66 enclosure range up to 50 °C without any derating - 60°C when derated 1 size.
- Low acoustic noise levels make it suitable for use in building services compared to similar competitor products.
- Advanced I/O and functionality can often remove the need to use an additional external controller or PLC to control the system

CONTROL MODE

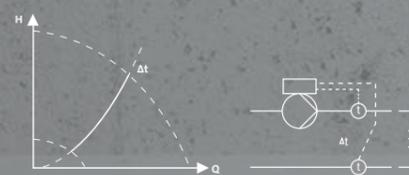
CONSTANT CURVE



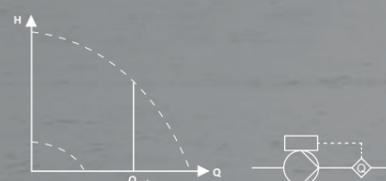
CONSTANT PRESSURE



CONSTANT DIFFERENTIAL TEMPERATURE



CONSTANT FLOW



SUPERIOR PERFORMANCE

through unique functionality

E-motors offer increased functionality, making them easy to use in a wide-range of complex applications.

The features listed are pump type dependant.

Multi-pump function including alternating, back-up or cascade function

The Multi-pump function makes it possible to control up to four parallel-coupled pumps without the need for an external controller. Four different multi-pump functions are available: Alternating time, Alternating energy, Back-up, and Cascade control.

Differential pressure or temperature control using two sensors

Use two sensors instead of one differential sensor for running in differential pressure mode or differential temperature control.

Proportional pressure

Proportional pressure control on pumps with user adjustable control curve for pressure loss compensation.

Low flow stop function

Improved energy optimisation, easy configuration and high comfort.

Stop at minimum speed function

Ensures that the pump will stop after a selected time when the controller is in saturation, forcing the pump to run at minimum speed.

Standby mode

For pumps only in operation for a few hours each day, standby mode minimises power consumption.

Loss of prime and dry run

Protects the pump against failure due to loss of prime and dry run.

LiqTec interface

Built-in interface for LiqTec sensor for dry run detection with or without time delay in order to get a minimum run time.

Pipe filling

Function for filling pipes without the risk of water hammer.

Constant torque

Run constant torque in, for example, positive displacement pump applications.

Pump curve adjustment

Create non-labile pump curves for applications where it is necessary for system control.

Run at power limit

Utilise the extra available power in the motor for additional pressure, or choose an under sized motor.

Specific energy estimation as function of flow

Calculates specific energy as a function of flow in the range kWh/m³.

Limit Exceed function

Makes the pump react to a measured or an internal value exceeding a user-defined limit. The pump can either give an alarm/warning or change operating mode and reduce the need for external controllers.

Setpoint influence

The setpoint influence function makes it possible to influence the controller setpoint using measured or internal values such as estimated flow.

Standstill heating (anti-condensation heating)

Standstill heating ensures that even during standstill periods, the motor windings are kept at a minimum temperature-heating both motor and terminal box.

DEDICATED FOR BUILDING SERVICES

AUTOADAPT function

The AUTOADAPT function continuously adjusts the proportional pressure curve and automatically sets the most efficient curve. (only TPE3 pumps).

FLOWLIMIT function

The FLOWLIMIT function eliminates the need for a pump throttling valve, reducing pressure loss in the system. (only TPE3 pumps).

FLOWADAPT function

FLOWADAPT is a control mode that combines AUTOADAPT with the FLOWLIMIT function. (only TPE3)

Built-in Heat Energy Monitor

Built-in heat energy monitor that can monitor heat energy distribution and consumption. (only TPE3 pumps).

Advanced work log

TPE3 pumps with the new MGE/MLE motors have an advanced logging function that can record and display:

- Duty point over time: The 20 latest duty points with the highest power consumption are shown.
- 3D histograms (Flow, head, time), (Flow, temp., time), etc.



THE MGE MOTOR

MODEL H/I/J

The Functional Module is available to suit your application in basic, standard, and advanced options with different I/O and other interfaces that enable you to utilise the many integrated pump features

Fitted with either a deep-groove ball bearing or an angular-contact bearing, depending on the motor use. At the non-drive end bearings with axial clearance ensure trouble-free operation and a long life.

Grundfos selects high-quality bearings from the world's leading manufacturers who comply with international standards. This makes it easy to find replacement bearings wherever you are.

The MGE PMSM contributes to efficiency levels IE5

Communication Modules (CIM) come in all common fieldbus protocols and save on installation and I/O components cost

The Control Panel is designed to suit the needs of your operation in basic, standard, or advanced editions – all with wireless communication.

Complete VFD unit is IP66 as standard.

BEARINGS		
Frame size	DE1)	NDE
MGE71	6204.2Z.C3 (6304.2Z.C3)	6204.2Z.C3
MGE80	6204.2Z.C3	6204.2Z.C3
MGE90	6305.2Z.C3	6204.2Z.C3
MGE100	6306.2Z.C4	6205.2Z.C3
MGE112	6306.2Z.C4 (7306BE.2CS)	6206.2Z.C3
MGE132	6308.2Z.C4 (7308BE.2CS)	6206.2Z.C3
MGE160	6309.C4 (7309BE)	6309.C4
MGE180	6310.C4 (7310BE)	6309.C4

1) Alternative bearings are used in motors for CRE pumps
2) High speed multi-stage pumps (CRNE-HS) use alternated DE/NDE bearing sizes



Shafts ends are available with smooth, open or closed keys.

Wide variety of motor mounting with flanges / shafts / feet all according to IEC and NEMA standards – customised combinations can be delivered as required.



All MGE are CE-marked and fulfil the EMC Directive 2004/108/EC and are tested according to the EN 61800-3 standard.

MGE motors up to 4kW (low speed) and 5.5kW (medium/high speed) are category C1, corresponding to CISPR11, group 1, class B, and can be installed in both residential areas (first environment) and industrial areas (second environment) without any limitations.

MGE motors above 4kW (low speed) and 5.5kW (medium/high speed) are category C3 and can be installed in industrial areas (second environment).
If equipped with an external Grundfos EMC filter, the motors are category C2 and may be installed in residential areas (first environment).

	FIRST ENVIRONMENT		SECOND ENVIRONMENT	
EN61800-3	Category 1	Category 2	Category 3	Category 4
CISPR11	Group 1, Class B	Group 1, Class A	Group 2, Class A	Not defined

APPROVALS



IMPROVED SERVICABILITY

Real time clock and date

This function time-stamps any alarms and errors so you can accurately track performance.

MGE pump recognition

Automatically transmits product data to remote connected tools, such as Grundfos GO, for easy identification.

Intelligent failure modes

Improved error codes ease troubleshooting and minimise down-time.

Advanced failure analysis

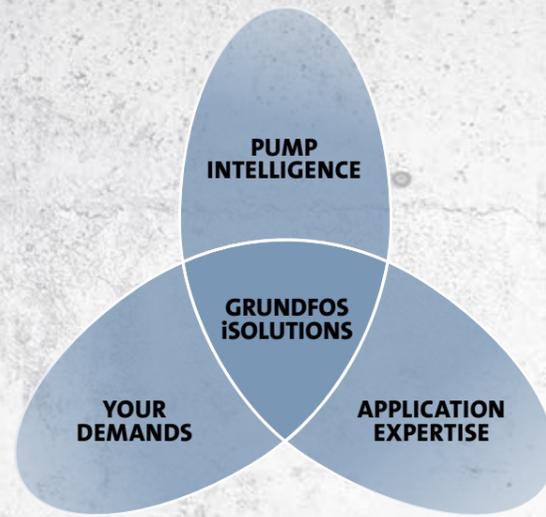
Datalog function includes information up to 20 seconds before the event happened.

WIRELESS COMMUNICATION

Wireless GENI communication automatically connects pumps to each other and to the remote control unit.

Grundfos R100 and Grundfos GO

The new MGE/MLE has IR interface to the well-known R100 remote controller. It can use the wireless GENI interface to communicate with the new remote controller Grundfos GO.



GRUNDFOS iSOLUTIONS

Grundfos iSOLUTIONS delivers the optimal combination of pumps, drives and auxiliary components for the specific application, incorporating special features and functions and building on application knowledge and experience.

Grundfos iSOLUTIONS allows easy integration of pumps, drives, measurement, controls, protections, and communication, saving you valuable engineering, installation and commissioning time.

Learn more on grundfos.com/isolutions



CHOOSE YOUR OWN MOTOR OR SELECT A PRECONFIGURED PUMP

	Configuration of MGE motors			... or preconfigured E-pumps		
<p>1st step:</p> <p>Select the motor size.</p>	<p>Select the line voltage and power (P2)</p> 			<p>Motor size based on your pump dimensioning</p> 		
<p>2nd step:</p> <p>Select the Functional Module (FM) tailored to your application</p>	<p>Basic (FM100)</p> <ul style="list-style-type: none"> • GENibus • CIM module support • Suitable for constant curve / open loop • Simple process control with constant pressure/ flow/ level/ temperature 	<p>Standard (FM200)</p> <ul style="list-style-type: none"> • GENibus • CIM module support • Suitable for constant curve / open loop • Demanding process control with constant pressure/ flow/ level/ temperature • Proportional pressure • AUTOADAPT • FLOWADAPT • Signal relay output • Digital Sensor I/O 	<p>Advanced (FM300)</p> <ul style="list-style-type: none"> • GENibus • CIM module support • Suitable for constant curve / open loop • Demanding process control with constant pressure/ flow/ level/ temperature • Proportional pressure • AUTOADAPT • FLOWADAPT • Signal relay output • Digital Sensor I/O • Pt100/1000 sensor • LiqTec dry-run protection • Real-Time Clock 	<p>Basic (FM100)</p> <ul style="list-style-type: none"> • None 	<p>Standard (FM200)</p> <ul style="list-style-type: none"> • CME • CMBE • TPE • NBE/NKE 	<p>Advanced (FM300)</p> <ul style="list-style-type: none"> • CRE • MTRE • Hydro MPC • Hydro Multi-E
	<p>3rd step:</p> <p>Select the Control Panel that suits your operations</p>	<p>Basic (HMI100)</p> 	<p>Standard (HMI200)</p> 	<p>Advanced (HMI300)</p> 	<p>Basic (HMI100)</p> 	<p>Standard (HMI200)</p> 
	<ul style="list-style-type: none"> • Grundfos EYE • Wireless communication 	<ul style="list-style-type: none"> • Grundfos EYE • Wireless communication • Start/Stop button for local operation with indicator light • Setpoint indicator and adjustment 	<ul style="list-style-type: none"> • Grundfos EYE • Wireless communication • Start / Stop button for local operation • Full color display • Full graphical monitoring and configuration 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • CRE • Hydro Multi-E • Hydro MPC • CME • CMBE • MTRE • TPE series 1000 • NBE/NKE 	<ul style="list-style-type: none"> • TPE series 2000 • TPE3

TECHNICAL INFORMATION

POWER – VOLTAGE/EFFICIENCY/LOAD/SPEED

Motor voltage	Speed [min ⁻¹]	Shaft Power P ₂ [kW]	Maximum torque		Maximum speed										
			Speed n [rpm]	Torque M _N [Nm]	Speed n _{max} [rpm]	Torque M [Nm]	Efficiency η [%]	Class	Power factor cos φ	Noise level dBA	Frame size	Model			
1 x 200-240V	1450-2000	0.25	1450	1.7	2000	1.2	83.4	IE5	0.95	43		MGE71	H		
		0.37	1450	2.45	2000	1.8	82.0	IE5	0.96						
		0.55	1450	3.6	2000	2.6	84.3	IE5	0.98						
		0.75	1450	5.00	2000	3.6	85.7	IE5	0.99						
	2900-4000	0.25	2900	0.8	4000	0.6	81.1	IE5	0.95	60		MGE71			
		0.37	2900	1.2	4000	0.9	84.0	IE5	0.96						
		0.55	2900	1.8	4000	1.3	85.3	IE5	0.98						
		0.75	2900	2.5	4000	1.8	85.2	IE5	0.99						
		1.1	2900	3.6	4000	2.6	86.9	IE5	0.99						
		1.5	2900	5.0	4000	3.6	87.4	IE5	0.99						
	4000-5900	0.25	4000	0.6	5900	0.4	77.9	IE5	0.92	68		MGE71			
		0.37	4000	0.9	5900	0.6	82.3	IE5	0.94						
		0.55	4000	1.3	5900	0.9	84.9	IE5	0.96						
		0.75	4000	1.8	5900	1.2	85.7	IE5	0.98						
		1.1	4000	2.6	5900	1.8	85.7	IE5	0.99						
		1.5	4000	3.6	5900	2.4	87.5	IE5	0.99						
	3 x 200-240V	3400-4000	1.1	3400	3.1	4000	2.6	89.3	IE5	0.91-0.92				MGE80	I
			1.5	3400	4.2	4000	3.6	89.3	IE5	0.91-0.92					
2.2			3400	6.2	4000	5.3	88.8	IE5	0.94						
3			3400	8.5	4000	7.2	90.3	IE5	0.94						
4			3400	11.3	4000	9.6	90.8	IE5	0.94						
5.5			3400	15.4	4000	13.1	90.2	IE5	0.94						
3 x 380-500V	1450-2000	0.25	1450	1.7	2000	1.2	81.2	IE5	0.58-0.52	43		MGE71	I		
		0.37	1450	2.45	2000	1.8	84.5	IE5	0.68-0.58						
		0.55	1450	3.6	2000	2.6	85.9	IE5	0.80-0.64						
		0.75	1450	5.0	2000	3.6	85.9	IE5	0.83-0.71						
		1.1	1450	7.2	2000	5.2	89.1	IE5	0.90-0.74						
		1.5	1450	9.9	2000	7.2	88.0	IE5	0.93-0.84						
	1450-2200	2.2	1450	14.5	2200	9.6	89.1	IE5	0.90-0.82	55		MGE100			
		3	1450	19.5	2200	12.9	90.1	IE5	0.91-0.86						
		4	1450	26.3	2200	17.4	90.3	IE5	0.92-0.87						
		5.5	1450	36.2	2200	23.9	91.9	IE5	0.92-0.88						
		7.5	1450	49.4	2200	32.6	92.2	IE5	0.93-0.89						
		11	1450	66.3	2200	44.4	92.2	IE5	0.93-0.89						
3 x 380-480V	4-pole	11	1460	72	-	-	87.5	IE3	0.91	68		MGE160M	F		
		15	1460	98	-	-	88.5	IE3	0.90						
		18.5	1460	120	-	-	87.5	IE2	0.91						
3 x 380-500V	2900-4000	0.25	2900	0.8	4000	0.6	81.2	IE5	0.58-0.50	60		MGE71	I		
		0.37	2900	1.2	4000	0.9	84.5	IE5	0.68-0.54						
		0.55	2900	1.8	4000	1.3	85.9	IE5	0.77-0.61						
		0.75	2900	2.5	4000	1.8	85.9	IE5	0.83-0.67						
		1.1	2900	3.6	4000	2.6	89.1	IE5	0.89-0.79						
		1.5	2900	5.0	4000	3.6	88.9	IE5	0.92-0.85						
	2900-4000	2.2	2900	7.2	4000	5.2	90.1	IE5	0.93-0.87	64		MGE90			
		3	2900	9.9	4000	7.2	90.7	IE5	0.91-0.86						
		4	2900	13.2	4000	9.6	92.2	IE5	0.92-0.87						
		5.5	2900	18.1	4000	13.1	92.7	IE5	0.92-0.88						
		7.5	2900	24.7	4000	17.9	92.5	IE5	0.93-0.89						
		11	2900	36.2	4000	26.3	93.1	IE5	0.93-0.90						
	3 x 380-480V	2-pole	15	2930	49	-	-	89.9	IE3	0.92	66			MGE160M	F
			18.5	2930	60.5	-	-	89.6	IE3	0.88					
22			2940	71.5	-	-	89.4	IE3	0.90						
3 x 380-500V	4000-5900	0.25	4000	0.6	5900	0.4	79.9	IE5	0.58-0.50	68		MGE71	I		
		0.37	4000	0.9	5900	0.6	84.0	IE5	0.67-0.53						
		0.55	4000	1.3	5900	0.9	86.8	IE5	0.76-0.61						
		0.75	4000	1.8	5900	1.2	88.1	IE5	0.82-0.66						
		1.1	4000	2.6	5900	1.8	88.5	IE5	0.88-0.74						
		1.5	4000	3.6	5900	2.4	89.1	IE5	0.90-0.83						
	4000-5900	2.2	4000	5.2	5900	3.5	90.1	IE5	0.91-0.85	74		MGE100			
		3	4000	7.2	5900	4.9	89.7	IE5	0.91-0.86						
		4	4000	9.6	5900	6.5	91.3	IE5	0.92-0.87						
		5.5	4000	13.1	5900	8.9	90.5	IE5	0.92-0.88						
		7.5	4000	17.9	5900	12.1	90.9	IE5	0.93-0.89						
		11	4000	26.3	5900	17.9	93.1	IE5	0.93-0.90						

TECHNICAL SPECIFICATIONS

MAINS CONNECTION

Voltage and Power (P2) range	1 x 200-240V : 0,25 - 1,5kW 3 x 380-500V : 0,25 - 11kW 3 x 380-480V : 15 - 22kW
Voltage tolerances	+/-10%
Frequency	50-60Hz +/- 5%
Network	TN/TT (IT with optional motor) according to IEC 60364

ENVIRONMENTAL LIMITS

Degree of protection	IP55/IP66 according to EN60529
Operating temperature	-20 to +60°C, derating above +50°C
Storage/transport temperature	-30 to +60°C
Altitude	0-1000m without derating
Humidity	0-95%, non-condensing

COMPLIANCE

Conformity to standards	MGE: CE, EAC, RCM, CCC, and cURus
Harmonics	IEC/EN 61000-3-12
EMC	Low speed motors ≤4kW and Medium/high speed motors ≤5.5kW: Category C1 according to EN 61800-3, corresponding to CISPR 11, class B, group 1 (residential areas) All other: Category C3 according to EN 61800-3, corresponding to CISPR 11, class A, group 2

INPUTS / OUTPUTS*

	FM100	FM200	FM300
Digital inputs	1	1	2
Digital inputs or open-collector outputs	1	1	2
Relay outputs (Form C)	-	2	2
Analog inputs	1**	2	3
PT100/PT1000 inputs	-	-	2
+5V Supply	Y	Y	Y
+24 Supply	-	Y	Y
RS-485 (GENIbus profile)	Y	Y	Y
Grundfos digital sensor input	-	Y	Y
LiqTec sensor input	-	-	Y
Digital inputs (dedicated)	0-5V		
Digital inputs/open-collector outputs	0-24V, resistive or inductive		
Analog input	0-20mA / 4-20mA, 0,5-3,5V / 0-5V / 0-10V		
Relay output	250V AC/30V DC, max. continues current 2A rms		
Communication options	GENIbus (CIM 050) LonWorks (CIM 100) PROFIBUS DP (CIM 150) Modbus RTU (CIM 200) GSM/GPRS (CIM 250) BACnet MS/TP (CIM 300) PROFINET IO (CIM 500) Modbus TCP (CIM 500) BACnet IP (CIM 500) CIM 500 (CIM 500)		

*) Only applicable for MGE Models H/I/J

**) Only 0,5-3,5V / 0-5V / 0-10V



IE5 motors
available up to 11kW