

Motors with integrated variable frequency converters designed for Grundfos pumps

Grundfos MLE motors
1/2 - 30 HP



GRUNDFOS 

Possibility in every drop

MLE motors designed for intelligent, connected and energy-efficient pump solutions

The Grundfos MLE motor is what drives our intelligent E-pump solutions that adapt pump speed according to demand to achieve significant energy savings. Standard for all E-pump Solutions, we have been manufacturing our own motors with integrated frequency converters for decades and today, Grundfos E-pumps use intelligent Ultra Premium Efficient permanent magnet MLE motors available up to 30 HP designed especially for frequency converter operations.

Why choose a pump with MLE motor?

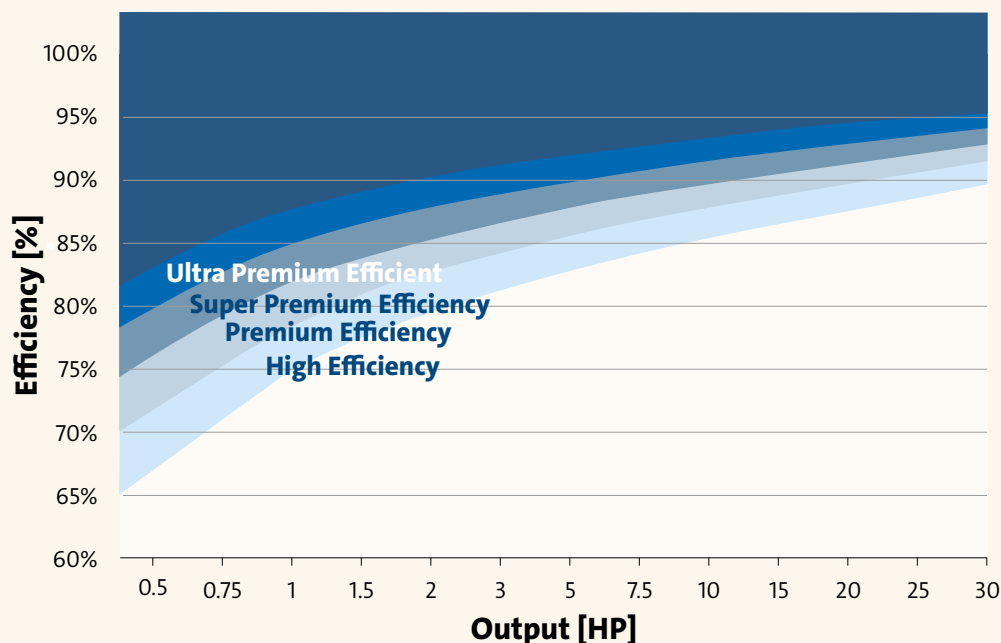
- Energy savings and higher performance from a more compact pump
- Dedicated functionality for specific pump applications pre-loaded – no further programming required
- Motor, frequency converter and pump from one manufacturer ensures trouble-free operation and commissioning
- The Safe Torque Off (STO) is a safety function integrated into the MLE motor that immediately stops torque generation from the motor shaft, improving operator safety and protecting equipment

- Predefined intelligent control modes such as constant pressure, proportional pressure, and constant level, make it easy to fit the pump into any application

Energy and cost savings with optimised efficiency

Grundfos MLE motors with Ultra Premium Efficient motors are our most energy efficient motors yet. These permanent magnet synchronous motors (PMSM) are designed especially for frequency converter operations and optimized for pump applications and high part-load efficiency. This results in a lower energy and lower lifecycle costs and meet Ultra Premium Efficient. Typically, Ultra Premium Efficient motors will achieve 10% energy savings and 25% reduction in payback compared to premium efficient motors. The majority of Grundfos MLE motors meet the next level of efficiency.

And we don't just meet current demands – we exceed them, so you can rest assured that our pump motors will continue to live up to even greater efficiency requirements in the future.



Superior performance through unique functionality

MLE 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 control with four functions available

Control up to four parallel-coupled pumps without the need for an external controller.

Safe torque off

STO functionality to ensure operator safety.

Serviceability

Ease troubleshooting and minimize downtime with improved error codes, accurate tracking of performance with time-stamped alarms and errors, and automatic transmission of product data to remote connected tools.

Differential pressure or temperature control using two sensors

Run in differential pressure mode or differential temperature control.

Proportional pressure

User adjustable control curve for pressure loss compensation.

Low flow stop function

Improved energy optimization, easy configuration and high comfort.

Stop at minimum speed function

Stops the pump 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 minimizes 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 to get a minimum run time.

Pipe filling

Function for filling pipes without the risk of water hammer.

Pump curve adjustment

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

Run at power limit

Utilize the extra available power in the motor for additional pressure, or choose an undersized motor.

Specific energy estimation as function of flow

Calculates specific energy as a function of flow in the range k

Limit Exceed function

The pump reacts to a measured or an internal value exceeding a user-defined limit.

Setpoint influence

Influence the controller setpoint using measured or internal values such as estimated flow.

Standstill heating (anti-condensation heating)

Even during standstill periods, the motor windings are kept at a minimum temperature, heating motor and terminal box.

Dedicated for Building Services

The MLE motor has additional functionality built-in and available with TPE3 pumps for Building Services:

Autoadapt

Adjusts continuously the proportional pressure curve and automatically sets the most efficient curve.

Flowlimit

Eliminates the need for a pump throttling valve, reducing pressure loss in the system.

Flowadapt

This control mode combines Autoadapt with Flowlimit

Built-in Heat Energy Monitor

Monitors heat energy distribution and consumption

Advanced work log

Advanced logging 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.



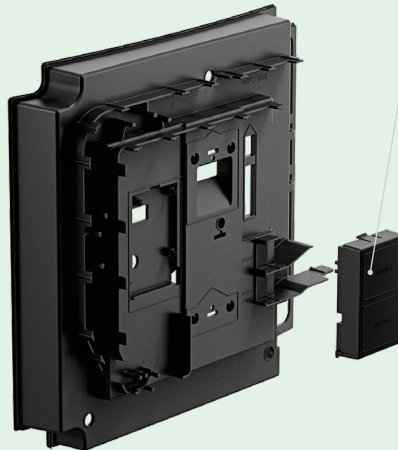
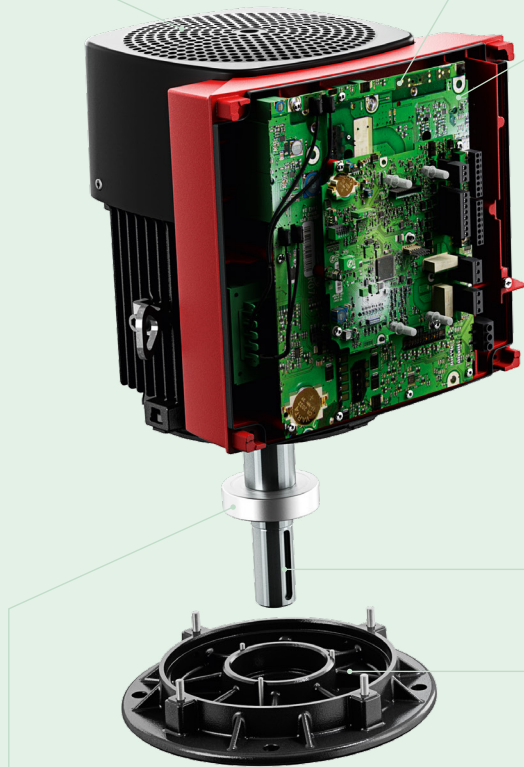
The MLE motor

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 utilize the many integrated pump features.

The MLE permanent magnet synchronous motor (PMSM) meets efficiency level Ultra Premium Efficient.

Safe Torque Off (STO) is a safety function integrated into the MLE motor that immediately stops torque generation from the motor shaft, improving operator safety and protecting equipment.

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



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.

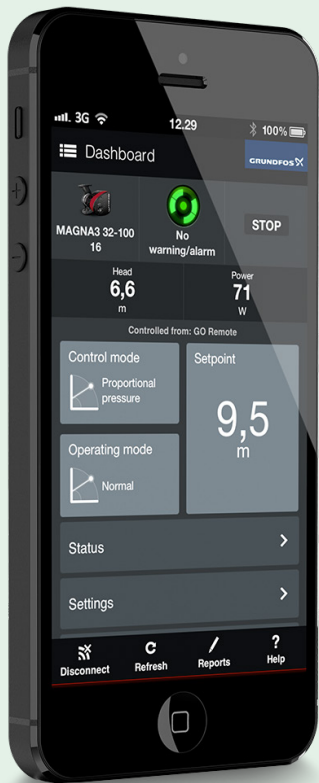
Shafts ends are available with smooth, open or closed keys.

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

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

Wireless connectivity and remote monitoring

Wireless GENI communication automatically connects pumps to each other and to the remote control unit. Furthermore, Grundfos makes apps and tools available for mobile pump control.



Grundfos GO

The Grundfos GO app combines a suite of professional tools and information that makes the daily work of installing, commissioning, controlling and maintaining your pump systems hassle-free and more efficiently from your smart device. The MLE uses a Bluetooth low energy (BLE) to communicate with Grundfos GO.

Download Grundfos GO from Google Play Store or Apple App Store.

Grundfos GO Link

Grundfos GO Link is a high-quality digital PC tool for the professional user that works with Grundfos pumps. The functional modules (FM310/FM311) with an Ethernet port makes it possible to connect the MLE directly to Grundfos GO Link for advanced troubleshooting and monitoring, as well as connect to Grundfos cloud solutions for monitoring of your pump systems.

Find Grundfos GO and Grundfos GO Link on product-selection.grundfos.com

Connectivity	
Wireless comm.:	GENIair and Bluetooth (BLE)
RS-485/AYB:	GENI and Modbus RTU
Ethernet:	GDP (Grundfos Digital Protocol) and GENI-TCP
Communication options:	LONWorks (CIM 100) PROFIBUS DP (CIM 150) Modbus RTU (CIM 200) 3G/4G cellular (CIM 260) Grundfos Connect (CIM 290/550)
	BACnet MS/TP (CIM 300) PROFINET IO (CIM 500) Modbus TCP (CIM 500) BACnet IP (CIM 500) Ethernet IP (CIM 500)

Operating panels		
HMI 100, HMI 101 ¹ (Basic)	HMI 200, HMI 201 ¹ (Standard)	HMI 300, HMI 301 ¹ (Display)

1) Without radio.

Technical Information

Power – Voltage/Efficiency/Load/Speed

Motor voltage	Speed [rpm]	Shaft Power P ₂ [HP]	Speedn [rpm]	Torque M _N [ft lb]	Speed n _{max} [rpm]	Torque M _{max} [ft lb]	Efficiency η [%]	Service factor	Power factor cos φ	Sound pressure level at 3,600 rpm dBA	Frame size	Model
1 x 200-240V	2900-4000	0,5	2900	0,9	4000	0,7	84	1,00	0,96	54.5	56C	H
		0,75	2900	1,3	4000	1,0	85.3	1,00	0,98	54.5		
		1	2900	1,8	4000	1,3	85.2	1,00	0,99	54.5		
		1,5	2900	2,7	4000	1,9	86.9	1,00	0,99	54.5		
		2	2900	3,7	4000	2,7	87.4	1,00	0,99	61		
3 x 200 -240V	3400-4000	1,5	3400	2,3	4000	2,0	88.5	1,15	0,91	54.5	56C	I
		2	3400	3,1	4000	2,7	88.5	1,00	0,92	54.5		
		3	3400	4,6	4000	4,0	88.5	1,15	0,94	61.5	182TC	J
		5	3400	7,7	4000	6,6	90.2	1,15	0,94	65		
		7,5	3400	11,6	4000	9,9	89.5	1,15	0,94	69.5	213TC	K
		10	3400	15,6	4000	13,2	90.2	1,15	0,94	73.8	254TC	
		15	3400	22,8	4000	19,4	91.7	1,10	0,94	73.8		
3 x 440-480V	3500-4000	1	3500	1,5	4000	1,3	86.4	1,25	0,73	54.5	56C	I
		1,5	3500	2,3	4000	1,9	89.6	1,15	0,84	54.5		
		2	3500	3,0	4000	2,7	89.4	1,15	0,87	61		
		3	3500	4,5	4000	3,8	90.7	1,15	0,89	61	182TC	J
		5	3500	7,5	4000	6,6	92.5	1,15	0,88	63		
		7,5	3500	11,3	4000	9,9	92.4	1,15	0,89	65.5	213TC	
		10	3500	15,0	4000	13,1	92.5	1,15	0,9	71		
		15	3500	22,5	4000	19,7	93.2	1,15	0,91	71	254TC	
		20	3500	30,0	4000	26,3	93	1,15	0,91	73.8	256TC	
		25	3500	37,5	4000	32,8	93	1,15	0,93	71.8	284TSC	
		30	3500	45,1	4000	39,4	94.1	1,15	0,94	71.9	286TSC	

Technical specifications

Power supply

Voltage and Power (P2) range	1 x 200-240V : 0.50-2HP 3 x 200-240V : 1.5-15HP 3 x 440-4480V : 1-30HP
Voltage tolerances	+/-10%
Frequency	50-60Hz +/- 5%

Environmental limits

Degree of protection	1/2hp – 15hp NEMA Type 2 20hp – 30hp NEMA Type 12
Operating temperature	-4 to +140°F, derating above +122°F
Storage/transport temperature	-22 to +140°F
Altitude	0-3,280ft without derating
Humidity	0-95%, non-condensing

Compliance

Conformity to standards	CE, UKCA, SEPPO, RCM and cURus (UL)
Harmonics ¹	IEC/EN 61000-3-2, IEC/EN 61000-3-12

EMC

Power P2 [kW]	MS	HS
3-5	C1	C1
7,5	C1	C1
10	C3/C ² , C2/C3 ^{4,3}	C3/C2 ²
15	C3/C ² , C2/C3 ^{4,3}	C3/C2 ²
20-30	C3/C ⁴	

¹ External low THD filter available on request.

² C2, if equipped with an external Grundfos EMC filter.

³ 3 x 200-240 V

⁴ Depending on the product hardware configuration.

Approvals



Bearings

Motor voltage	Shaft Power P ₂ [HP]	DE ¹	NDE
1 x 200-240V	0,5	6304.2Z.C3	6204.2Z.C3
	0,75	6304.2Z.C3	6204.2Z.C3
	1	6304.2Z.C3	6204.2Z.C3
	1,5	6304.2Z.C3	6204.2Z.C3
	2	6306.2Z.C3	6204.2Z.C3
3 x 200 -240V	1,5	6304.2Z.C3	6204.2Z.C3
	2	6306.2Z.C3	6204.2Z.C3
	3	6306.2Z.C3	6205.2Z.C3
	5	7306.BE.2CS	6206.2Z.C3
	7,5	7308.BE.2CS	6206.2Z.C3
	10	7309.BE	6309.Z.C4
	15	7309.BE	6309.Z.C4
3 x 440-480V	1	6304.2Z.C3	6204.2Z.C3
	1,5	6304.2Z.C3	6204.2Z.C3
	2	6306.2Z.C3	6204.2Z.C3
	3	6306.2Z.C3	6204.2Z.C3
	5	7306.BE.2CS	6206.2Z.C3
	7,5	7308.BE.2CS	6206.2Z.C3
	10	7308.BE.2CS	6206.2Z.C3
	15	7309.BE	6306.Z.C3
	20	7309.BE	6309.Z.C4
	25	7310.BE	6310.Z.C4
	30	7310.BE	6310.Z.C4

¹ Bearings used in MLE motors for CRE and MTRE pumps.

Inputs/outputs

	FM310, FM311 ¹
Digital inputs	2
Digital inputs/outputs	2
Relay outputs	2
Analog inputs	3
Pt100/Pt1000 inputs	2
Analog outputs	1
+5 V supply	2
+24 V supply	2
Grundfos Direct Sensor input	Yes
LiqTec sensor input	Yes
STO – Safe Torque Off	Yes
Ethernet	Yes
Analog input: 0-20 mA / 4-20 mA, 0.5 - 3.5 V / 0-5 V / 0-10 V	
Relay output: 1 x LIVE/SELV 250 VAC/30 VDC, 2A and 1 x SELV 30 VDC, 2A/30 V DC, max. continuous current 2 A rms	

¹ Without Bluetooth.

Grundfos E-pumps using the MLE motor

The range of Grundfos E-pumps using intelligent Ultra Premium Efficient MLE motors up to 30 HP are:



CRE

Powerful high efficiency inline multistage pumps for numerous applications

CME

Compact and customizable horizontal multistage supply and transfer pumps for industry

MTRE/MTSE

Reliable and efficient immersible pumps for industrial liquid transfer

NBE/NKE

High-efficiency end-suction power for demanding applications

Hydro MPC

The application optimized Hydro MPC pressure booster range