Grundfos submersible motors – in a class of their own

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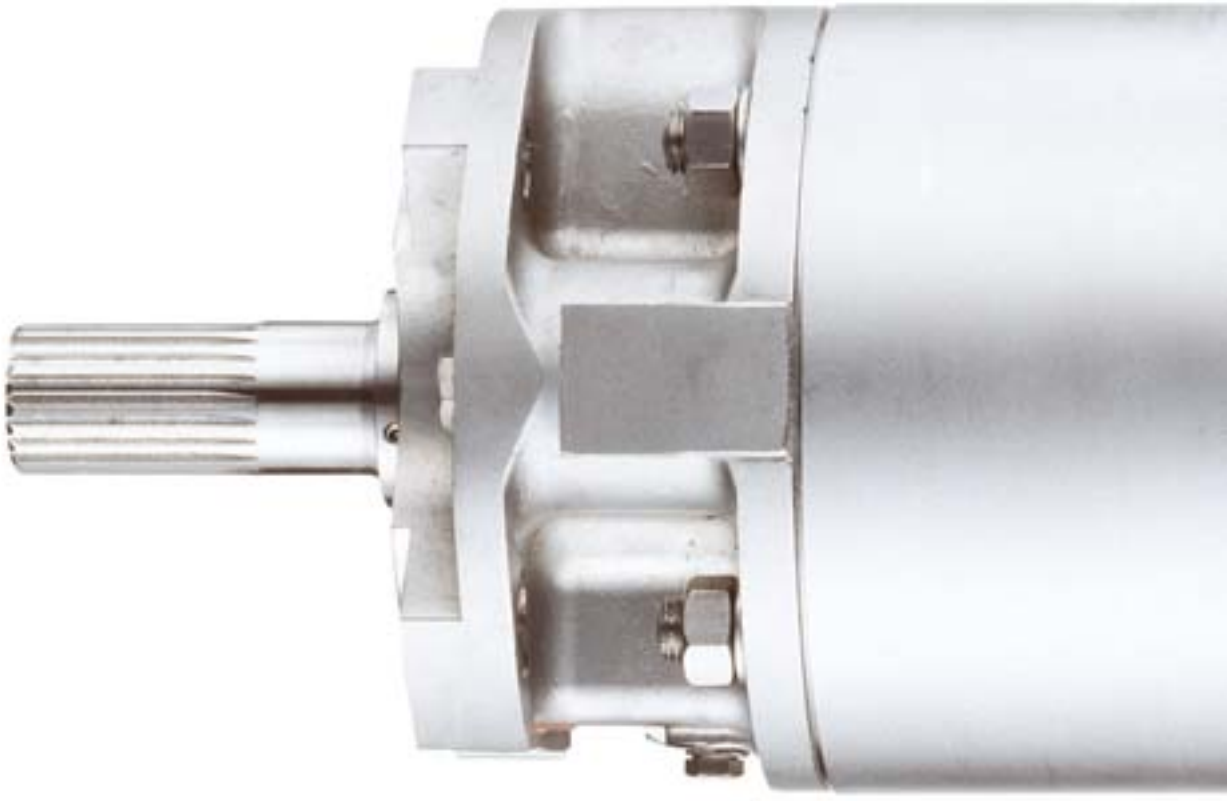
GRUNDFOS

More than 30 years' experience

Grundfos has been manufacturing quality submersible motors for more than 30 years, and the highly efficient Grundfos MS and MMS submersible motors are rated among the very best on the market. The MS and MMS motors are based on state-of-the-art technology that comprises highly reliable shaft seals and heavy-duty thrust bearings. High efficiency and a long operating life ensure low long-term Cost of Ownership.

As one of the world s leading pump manufacturers, we know better than anyone what is required of a reliable submersible motor. The Grundfos motors are suitable for all makes of submersible pumps, including, of course, the comprehensive Grundfos SP range.

The canned MS motors are available in 4" and 6" versions up to 30 kW (40 hp), while the rewindable MMS motors are available in 6" - 12" versions up to 250 kW (340 hp). A range of specially designed MS industrial versions with increased efficiency and a noticeably longer operation lifetime is also available.



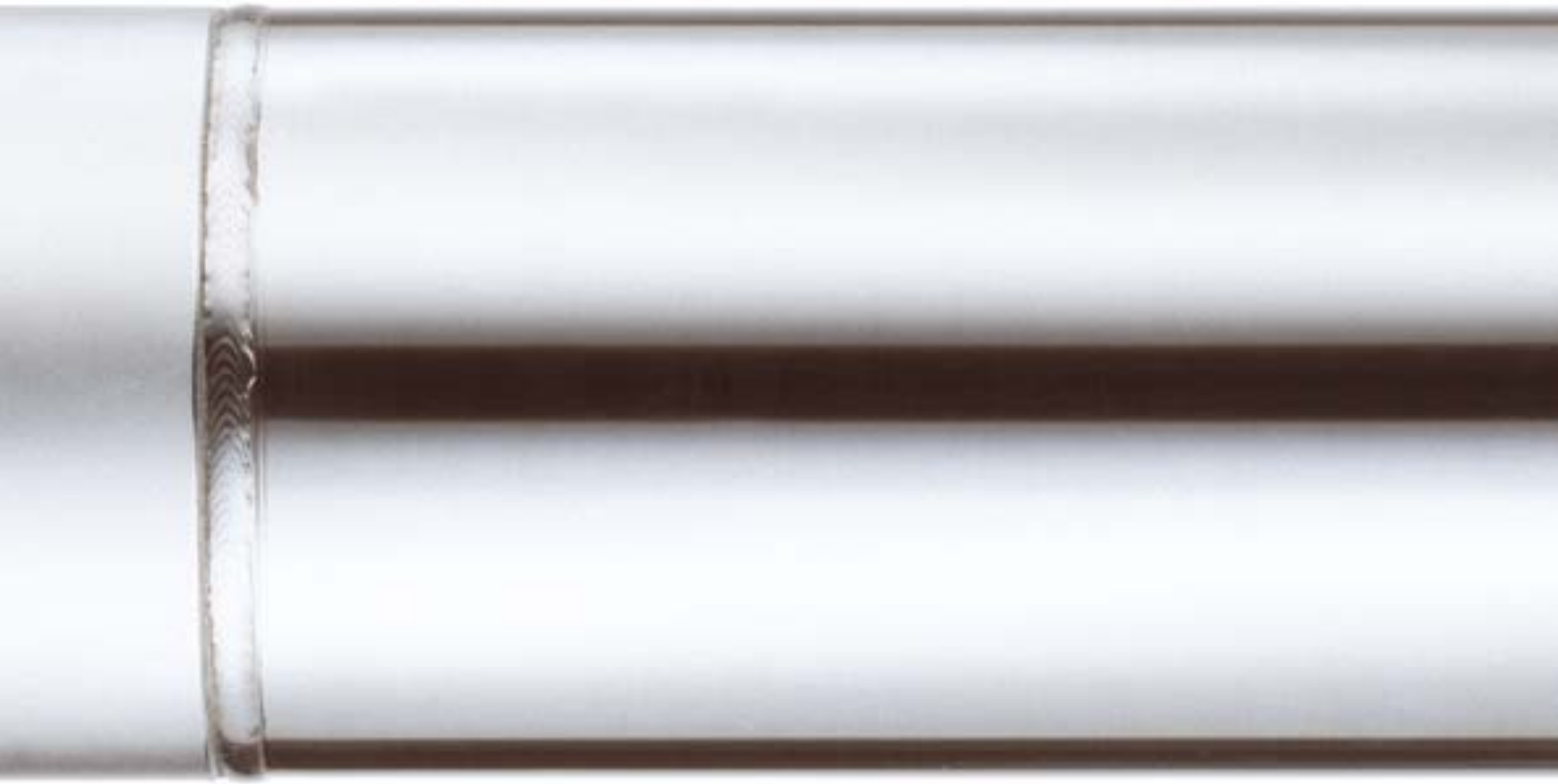
Grundfos MS range

The Grundfos MS range of canned submersible motors is available in 4" and 6" sizes in two main executions, MS 402 and MS 4000/MS 6000 respectively.

Low motor temperature

Due to a unique thin rotor can in the MS motors, the internal loss of the motor is kept to a minimum. In combination with a large cooling surface and internal liquid circulation this provides efficient cooling for long lifetime. Low motor temperature also means a high efficiency and low running cost.

Grundfos MS ar
– reliable high-effi



MS 402
MS 402 is designed for the domestic ground water market and covers outputs up to 2.2 kW (3 hp).

The MS 4000 and MS 6000 series are designed for use in a variety of applications in water supply. When equipped with features like oversized motor, temperature measurement, cooling jacket, and SiC/SiC mechanical shaft seals, these versions are suitable for heavy-duty industrial applications such as dewatering operations.

MS 4000
4" motor, up to 7.5 kW (10 hp).

MS 6000
6" motor, up to 30 kW (40 hp).

As a standard, all external surfaces of the Grundfos MS motors in contact with water are made of stainless steel DIN W. Nr. 1.4301 (AISI 304). For aggressive water, such as seawater or brackish water, R-versions made of DIN W. Nr. 1.4539 (AISI 904 L) are available.

Attention should be attached to the submersible drop cable. Too small a cable reduces motor efficiency and may cause overheating of the motor. Grundfos, therefore, recommends max. 1% cable loss.

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iciency performers

Grundfos MMS range

The MMS range of rewindable motors is available in sizes 6", 8", 10", and 12".

The MMS motors are suitable for any submersible installation, including heavy-duty industrial applications and dewatering operations (when equipped with temperature control, oversized motor, cooling jacket, and SiC/ SiC mechanical shaft seals).

As a standard the MMS motors are supplied with black cast-iron end-bells. Optionally, the range is available in all-stainless steel DIN W.-Nr. 1.4401 (AISI 316) or DIN W.-Nr. 1.4539L (AISI 904) versions.

- **MMS 6000**
  6" motor up to 37 kW (50 hp).
- **MMS 8000**
  8" motor up to 110 kW (150 hp).
- **MMS 10000**
  10" motor up to 190 kW (260 hp).
- **MMS 12000**
  12" motor up to 250 kW (340 hp).

Rewindability
The rewindable construction of the Grundfos MMS motors imply low costs of repair in case of damage of the stator windings. Moreover, as rewinding can be made locally, long-distance shipping and extended downtime periods can be avoided. The simple design with few basic components also greatly facilitates service and repair of the motor.

Temperature monitoring
Almost all failures occuring in submersible pumping installations are caused by too high motor temperature. To achieve maximum protection against motor burnout, the Grundfos MMS motors can be fitted with a Pt 100 temperature sensor. Together with a relay or, optionally, the Grundfos CU 3 control unit, the sensor provides optimum control and protection of the motor.

The MS motors can be supplied with a built-in Tempcon temperature transmitter, which communicate via the power line. This means no extra cables and sensors in the borehole or well.

All MS motors, and 6" and 8" MMS motors are made with Nema connection.

All MS and most MMS motors can be installed horizontally.

All MS and MMS motors are equipped with an up-thrust stop ring that prevents up-thrust damaging at start-up and stopping.

High thrust capacity
The Michell-type thrust bearings feature 4 or 6 carbon pads and one ceramic counterpart for high thrust capacity. This type of bearing is unique in the way that the lapping of the rotating part ensures a quick build-up of a water film in the thrust bearing during start up. The bearing is of a bidirectional construction and can be adjusted to the required shaft height.

Monitoring
Motor protection and energy optimisation possible with remote monitoring facilities CU 3 control unit, SM 100 sensor module, R100 remote control, and G100 gateway and datalogger

Temperature sensor
Temperature monitoring and motor protection available by means of a Tempcon sensor

High efficiency
High motor efficiency provides energy savings

Industrial version available
Extra high efficiency and increased operation lifetime

Thrust bearing
Heavy-duty thrust bearing with high thrust capacity

Cable
Motor cable approved for drinking water

Shaft seal
Mechanical ceramic/carbon shaft seal is standard. SiC/SiC shaft seal optional for water with high content of sand

Warm water version
Warm water versions available

Contamination free
Water-filled motor design prevents water contamination

Corrosion resistance
High-grade materials provide high corrosion resistance. Available in all-stainless steel DIN W.-Nr. 1.4301 (AISI 304), DIN W.-Nr. 1.4539 (AISI 904 L). For aggressive water the motor can be supplied with Vitonfi rubber vs. standard neoprene NBR for drinking water

Lightning protection
The MS 402 motor is capable of withstanding transients up to 15 kV, which makes the motor resistant to lightning, even near to a pump installation

GRUNDFOS **MS RANGE**

0.37 kW (0.5 hp) - 30 kW (40 hp)

Get in complete control

Online monitoring and control
The Grundfos CU 3 control unit, is an electronic motor protection device capable of monitoring the motor and the pump performance via the handheld R100, remote control. The CU 3 control unit can provide online information of vital motor and pump data to a PC tool or to a monitoring system (SCADA), either directly or via the Grundfos G100 gateway and data logger. With sensors installed, the water table and cost per pumped volume of water can be monitored.

Optimum time for service or maintenance
Preventive service and maintenance of a pumping system often take place at fixed intervals. This is clearly not an optimum solution as the pumping operation may result in unnecessarily high pumping costs and unnecessary stress of the pump and motor. Only via continuous monitoring, ideally online, will it be possible to choose the optimum time for maintenance or service of the system.

CU 3 control unit enables protection against:

- Dry running and overload
- Operation against a closed valve or discharge pipe
- Insufficient flow of water past the motor
- Too high temperature of the pumped water
- Deposits on the motor, which may compromise cooling of the motor
- Overvoltage or undervoltage
- Phase asymmetry
- Incipient motor failure
- Motor overheating

Monitoring
Motor protection and energy optimisation possible with remote monitoring facilities CU 3 control unit, SM 100 sensor module, R100 remote control, and G100 gateway and datalogger

Temperature sensor
Temperature monitoring and motor protection by means of a Pt 100 sensor

Windings
Rewindable motor construction enables local repair of damaged windings

High efficiency
High efficiency provides energy savings

Thrust bearing
Heavy-duty thrust bearing with high thrust capacity

Motor cable
Cable approved for drinking water available

Earth cable
Inside or outside earth cable available

Shaft seal
Mechanical ceramic/carbon shaft seal is standard. SiC/SiC shaft seal optional for water with high content of sand

Warm water version
Warm water version available with PE2 + PA wire

Contamination free
Water-filled motor design prevents water contamination

Corrosion resistance
High-grade materials provide high corrosion resistance. Black cast iron end-bells as standard. Available in all-stainless steel DIN W.-Nr. 1.4401 (AISI 316) or DIN W.-Nr. 1.4539L (AISI 904) versions

GRUNDFOS **MMS RANGE**

3.7 kW (5 hp) - 250 kW (340 hp)

Technical data

Complete motor documentation, incl. performance curves, is available in data booklets or via the Grundfos WinCAPS software tool.

MS 402

Phase:	1 and 3 phase
Start/run methods:	1 phase: PSC, 2W, 3W 3 phase: DOL/SD
Frequency:	50 Hz and 60 Hz
Voltage:	115-575 V
Thrust load:	Max. 3.5 kN
Efficiency:	57-77
Insulation class:	B
Ambient temperature:	See Grundfos documentation
Mechanical connection:	4" Nema flange
Material:	Stainless steel DIN W.-Nr. 1.4301 (AISI 304)
Certification:	UL and CSA available

MS 4000

Phase:	1 and 3 phase
Start/run methods:	1 phase: 3W 3 phase: DOL/SD
Frequency:	50 and 60 Hz
Voltage:	208-575 V
Thrust load:	6.5 kN or 27.5 kN
Efficiency:	75-81
Insulation class:	F
Ambient temperature:	See Grundfos documentation
Mechanical connection:	4" Nema flange
Material:	Stainless steel DIN W.-Nr. 1.4301 (AISI 304) + W.-Nr. 1.4539 (AISI 904L)
Certification:	CSA available

MS 6000

Phase:	3 phase
Start/run methods:	DOL, SD
Frequency:	50 and 60 Hz
Voltage:	200-575 V
Thrust load:	6.5 kN or 27.5 kN
Efficiency:	81-86
Insulation class:	F
Ambient temperature:	See Grundfos documentation
Mechanical connection:	6" Nema flange.
Material:	Stainless steel DIN W.-Nr. 1.4301 (AISI 304) + W.-Nr. 1.4539 (AISI 904L)
Certification:	CSA available

MMS

Phase:	3 phase
Start methods:	DOL, SD
Frequency:	50 and 60 Hz
Voltage:	200-1000 V
Thrust load:	6", 15 kN or 27.5 kN 8" and 10", 50 kN 12", 70 kN
Efficiency:	70-91
Insulation class:	Y, possible A
Ambient temperature:	See Grundfos documentation
Connection:	6" and 8" with Nema flange
Material:	Stainless steel DIN W.-Nr. 1.4401 (AISI 316L) stator tube with cast iron endbells EN-JL-1040, or all-stainless steel DIN W.-Nr. 1.4401 (AISI 316L)

At Grundfos, research and development at the highest level is an ongoing commitment that accounts for investment of more than USD 55 million a year.

Grundfos was the first pump manufacturer in the world to be certified according to the ISO 9001 Quality Standard.

Today, all Grundfos production companies have been certified according to the ISO 9000 Production Quality Assurance Standard and ISO 14001 for environmental. The current field failure rate for Grundfos submersible pumps, motors, and controls is less than 1%.

VENTURE MARKETING A/S

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Motors that make a difference

- Canned MS motors in 4" and 6", up to 30 kW
- Rewindable MMS motors in 6" - 12", up to 250 kW
- High efficiency provides operation costs savings
- All stainless steel means high corrosion resistance
- Heavy-duty bearings with high thrust capacity
- Water-filled motors and drinking water-approved cables prevent water contamination
- Overheating protection with Tempcon or Pt 100 on request
- Mechanical ceramic/carbon shaft seal. SiC/SiC shaft seal optional for high sand resistance
- Warm water versions available
- Motor protection and energy optimisation with remote monitoring facilities

Grundfos WinCAPS for an optimised system selection

Motor selection ideally always starts with the selection of the correct pump size or pumping system. Grundfos WinCAPS is a highly advanced software tool designed to help our customers assess the so-called wire-to-water efficiency and to compare the Life Cycle Costs between alternative solutions.

Grundfos WinCAPS contains complete information about all Grundfos motors and pumps, including performance data and curves, drawings, and installation and service information.

An optimisation feature in WinCAPS enables you to fine-tune each important part in your pumping system. It enables you to find the most effective way of operation and to select the motor with the highest efficiency for the specific task. The dimensioning features of the program illustrate the consequences of changing parameters in the pumping system or in the mode of operation.