SUBMERSIBLE SYSTEMS

STRENGTH, PERFORMANCE AND EFFICIENCY

be
think
innovate

GRUNDFOS

COMPLETE SUBMERSIBLE PUMP SYSTEM

The SP range is your guarantee for high-quality water supply and is capable of handling flows up to 470 m^3/h and head up to 810 m. With the new, updated 4" range Grundfos can equip any application with a complete SP system to optimise performance and energy efficiency. Should you require more components to accommodate your specific needs the flexible system easily makes room for these.

A complete system combines a stainless-steel SP submersible pump, an MS/MMS motor made to match the pump, a dedicated electronic motor protection unit or variable speed drive, and a remote management system. The complete package gives you total peace of mind by making sure your water supply application works every time.

THE PUMP

SP pumps combine the very best materials with superior hydraulic design.

- Efficient, reliable pumps
- Customisation of products
- High availability through local sub factories and distributors
- A wide range of pump diameters and flow rates

THE MOTOR

For reliability, high efficiency and to keep lifecycle costs low, we build the motor to match the pump. We have been doing this for more than 30 years and our submersible motor know-how is unsurpassed.

- MS and MMS submersible motors have been specially developed for the SP pump
- Motors that match the best efficiency point of the pumps
- Motors are all available in various grades of stainless steel
- Reliable and corrosion resistant
- Long life even in rough conditions

CONTROLS AND MONITORING

Add functionalities and increase reliability of the SP system by using a motor protection unit (MP 204) or a variable frequency drive (CUE), and Grundfos Remote Management.

- Variable frequency drive (CUE), for speed, pressure, level and flow control of the pump
- 24 hour remote monitoring of the motor and system
- Protection of all vital pump parameters, including dry running and overload
- Trouble-free operation
- Reduced need for pump service

GRUNDFOS GO

Grundfos GO is mobile control, offering:

- Full control over your pumps on the go; you can change configuration parameters and monitor electrical data
- Quick and easy access to information using the catalogue for product searches
- Compatible with MP204

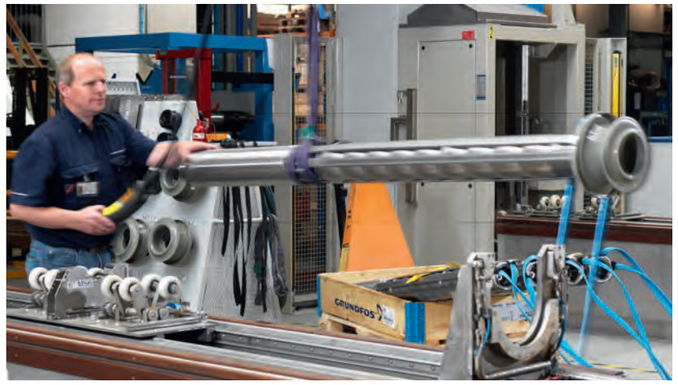
STAINLESS STEEL
FOR ALL ENVIRONMENTS AND APPLICATIONS

SP systems are used worldwide wherever efficient water handling is called for. The main application areas are irrigation of farmland and groundwater extraction for tap water, but there are many other, more specialised uses. Wherever you need water to move, SP systems will do it with complete reliability.

- **Reliability** – 100% high-grade stainless steel inside and out with resistance to sand and corrosive water built in
- **High efficiency** – superior hydraulics and a motor that is made for the pump result in superior efficiency
- **Lower lifecycle costs** – the system approach keeps reliability and efficiency high and reduces costs over the product lifetime
- **Testing performance to the highest standards** – Grade 3B test as standard, and we test to Grade 1 and 2 at the customer's request
- **A wide range** – available in 4, 6, 8, 10 and 12 inch diameter versions with flow rate up to 470 m³/h and head up to 810 m

FIND FULL DATA ONLINE

Complete data is available at our online library at product-selection.grundfos.com



EXPERT DESIGN EXPERT TESTS

The SP pumps are the result of decades of experience and constant improvements but we leave nothing to chance. All pumps undergo performance tests before they leave the factory to ensure the highest possible reliability under ground.

On request pumps can be tested according to the Grade 1 standard at our state-of-the-art testing facilities.

A CLOSER LOOK AT THE SP PUMP

- **Improved discharge**
  Easier and safer attachment to the riser pipe
- **Cable guard attachment**
  Improved screw-on attachment of the cable guard
- **Built-in non-return valve**
  All SP pumps are delivered with a non-return valve to minimise the risk of water hammering damage
- **Corrosion resistant**
  AISI 304 stainless steel inside and out makes the SP very resistant to corrosion and extra high-grade steel versions for aggressive liquids also available
- **Wear resistance**
  Less abrasive wear: Octagonal bearings and sand flush channels remove particles with the pumped water. Sand resistance is further increased by using the bearing that provides longer life time in sandy underground environments
- **Optimised hydraulics**
  For better performance and fewer breakdowns
- **FKM rubber parts**
  This option makes the SP suitable for water slightly contaminated with, for example, oil
- **Stop ring**
  Protect the pump in case of up thrust
- **Failure rate close to zero**
  Durable and well-protected: Statistics compiled since 1967 show that SP pumps have a warranty return rate close to zero
- **Customised solution**
  Contact your Grundfos distributor if you require a SP system tailored to your specific application

MOTORS
MADE TO MATCH THE PUMP

Grundfos has been making submersible motors for more than 30 years and is one of the world's largest manufacturers of high-quality submersible motors. The MS and MMS submersible motors are not only rated among the very best on the market for use with submersible pumps of any make, they are also designed to be the perfect fit for the SP pumps, matching their best duty points.

- Canned MS motors, 4" and 6", up to 30 kW
- Rewindable MMS motors, 6" - 12", up to 250 kW
- Water-filled motors and drinking water-approved cables prevent water contamination
- Overheating protection with Tempcon (MS) or Pt 100/1000 on request
- Mechanical ceramic/carbon shaft seal – SiC/SiC shaft seal optional for high sand resistance
- Warm water versions available – up to 60°C

MS: COMPACT AND EFFICIENT

The MS range of canned submersible motors comes in sizes of 4" and 6".

- **MS 402**
  Designed for the domestic ground water market and covers outputs up to 2.2 kW (3 hp)
- **MS 4000/MS 6000**
  Covers a range of water supply applications that require power up to 30 kW

All external surfaces of Grundfos MS motors in contact with water are made of stainless steel EN 1.4301 (AISI 304) unless otherwise specified. R-versions made from EN 1.4539 (AISI 904 L) are also available for aggressive water.

MS motors are fitted with a built-in Tempcon sensor to monitor the motor's operation temperature – a solution which together with a Grundfos MP 204 eliminates the need for external temperature sensors.

MMS: POWERFUL, EFFICIENT, AND EASY TO REPAIR

The MMS range of rewindable motors is available in sizes 6", 8", 10", and 12" up to 250 kW. They are suitable for any submersible installation, including heavy-duty industrial applications and dewatering operations.

A CLOSER LOOK AT THE MS/MMS MOTORS

- **Exchangeable shaft seal**
  The standard mechanical shaft seal used in the MS/MMS motors is very easy to service and replace. For applications that involve sand or abrasives, a SiC/SiC sand-resistant shaft seal is also available
- **Tempcon sensor (MS)**
  MS motors are available with a built-in Tempcon or Pt 100/1000 temperature sensor, eliminating the need for extra cables or sensors
- **Corrosion resistant**
  The MS/MMS motors are available in stainless steel to match the corrosion resistance of the SP pump units. Extra high-grade steel versions for aggressive liquids also available
- **Rewindable motor (MMS)**
  In MMS motors the stator can be rewound locally, ensuring minimal cost and downtime
- **High thrust capacity**
  Michell-type thrust bearings with high thrust capa-city. Quickly builds up a water film during start-up to ensure high thrust capacity
- **Motor protection and monitoring**
  Optimise reliability and monitor performance with electronic motor protection (MP 204) or a Variable Frequency Converter (CUE) and a remote monitoring system (Grundfos Remote Management)
- **Warm water version**s
  Available for temperatures up to 60°C for MS and 50°C for MMS motor series

Find full data online

Complete data is available at our online library at product-selection.grundfos.com

MONITORING AND CONTROL, FOR ALL SITUATIONS

As part of the SP system, Grundfos offers reliable, easy to set up and easy to use motor protection (MP 204), a complete range of external Variable Frequency Drives designed for speed control (Grundfos CUE) and cost-effective and straightforward monitoring and management of the pump installation (Grundfos Remote Management).

Open and interoperable networks

For data communication, the Grundfos fieldbus concept is the ideal solution for complete control of pumps and pump systems and utilises open and interoperable networks. Our data communication interfaces offer ease of installation and commissioning, user-friendliness, and great value for money.

MP 204 and Grundfos CUE are compatible with Grundfos Remote Management and can be connected to any SCADA system, allowing remote access to pump data anywhere.

MP 204 MOTOR PROTECTION

The perfect partner for the SP system in many applications, protection is provided for motors ranging from 3 to 999 amps and voltages from 100 to 480 VAC against undervoltage, overvoltage and other variations in power supply that may cause overheating of the submersible motor.

When used with the SP/MS configuration, the Tempcon sensor lets MP 204 keep an eye on the motor temperature at all times. If the temperature reaches 60°C it will issue a warning signal. If it reaches 75°C, the MP 204 will stop the motor to prevent damage.

Other benefits include:

- Power factor measurement, giving an indication of clogging in the intake or impeller wear
- Motor power consumption continually checked with precision, stopping the pump before dry running, preventing pump damage
- Warning for ground failure/insulation resistance, allowing preventive maintenance of the motor, cables, or cable joints

MP 204 protection and monitoring parameters

- Insulation resistance before start-up
- Temperature (Tempcon, PT sensor and thermal switch)
- Overload/underload
- Overvoltage/undervoltage
- Phase sequence
- Phase missing
- Power factor (cos ϕ)
- Power consumption
- Harmonic distortion
- Current asymmetry
- Run and start capacitor (single-phase)
- Operating hours and number of start

VARIABLE FREQUENCY DRIVES – CUE

Our complete range of external frequency converters is designed for speed control of the pump and motor, enabling substantial running costs savings at varying capacity demands. Furthermore, the frequency converter gives motor protection as well as soft start and stop of the submersible motor.

Predefined control modes (speed, flow, level and pressure), sensor range and pump family data make it very easy to set up a system in only a few steps.

CUE shares the unique Grundfos intuitive interface with Grundfos control equipment. Installation and set-up is very easy – just 16 steps are required to get a system up and running. Additional functions are available that for example provide better application support and system optimisation.

The frequency converter can be built into a panel and supplied as a complete solution ready for easy onsite installation.

GRUNDFOS REMOTE MANAGEMENT

Grundfos Remote Management is a cost-effective and straightforward way to monitor and manage pump installations in water supply and irrigation.
It reduces the need for onsite inspections and in the event of an alarm or warning, the relevant people are notified directly. A built-in multi-purpose I/O board allows the connection of sensors and switches.

Grundfos Remote Management offers:

- A full overview of the operation, performance and trends and see the status of your entire SP system on your own map or aerial photo
- Live monitoring, analysis and adjustments, monitoring of energy consumption, and optimisation of system performance.
- Preventative maintenance; plan service work on the basis of actual operating data and get notification when service is due.

Find full data online

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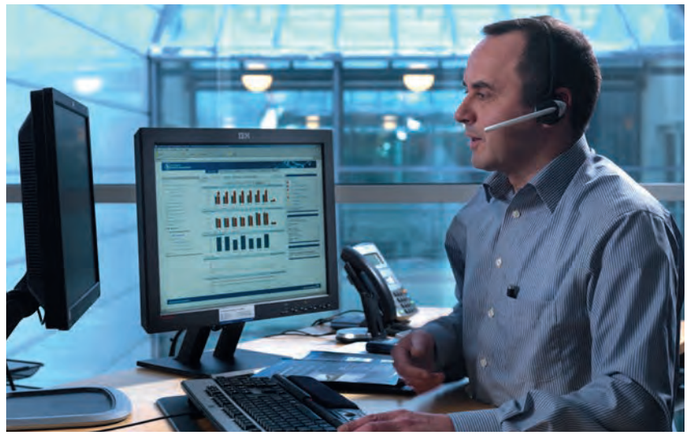
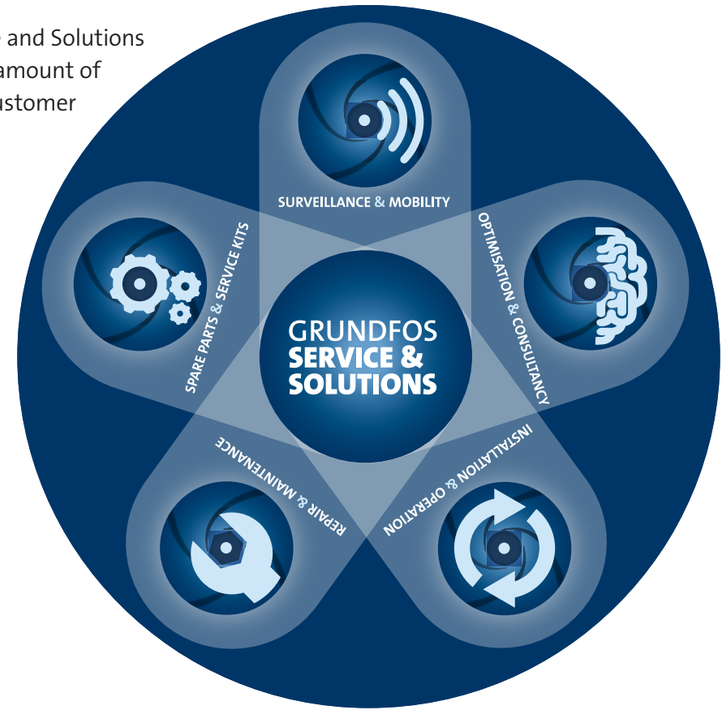


GRUNDFOS **SERVICE & SOLUTIONS**

The philosophy behind Grundfos Service and Solutions is to add a little extra that gives a huge amount of value to your SP system. Built to meet customer needs, Grundfos service products are available through a truly global network with a local presence in all markets.



SERVICE OFFERINGS

Service products from Grundfos are brought together under five portfolios so you can easily find what you need:

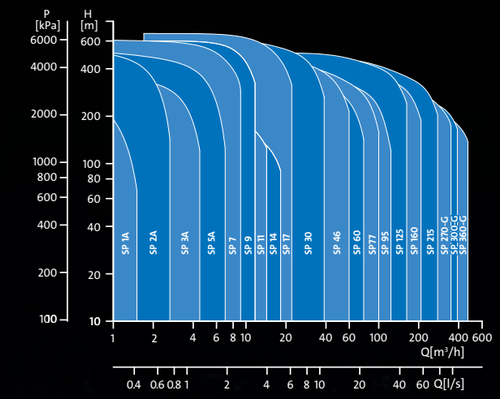
- Spare parts & service kits
- Repair & maintenance
- Installation & operation
- Optimisation & consultancy
- Surveillance & mobility

Find the service product portfolios at **www.grundfos.com/service-support**

SPARE PARTS & SERVICE KITS	
RECOMMENDED SPARE PARTS	●
REPAIR & MAINTENANCE	
FLOW & PRESSURE MEASUREMENT	●
PUMP ADJUSTMENT	●
ONSITE REPAIR	●
WORKSHOP REPAIR	●
INSTALLATION & OPERATION	
COMMISSIONING	●
INSTALLED BASE ASSESSMENT	●
SERVICE CONTRACT BASIC	●
SERVICE CONTRACT ADVANCED	●
SERVICE CONTRACT PREMIUM	●
OPTIMISATION & CONSULTANCY	
PUMP AUDIT	●
REPLACEMENT (GRUNDFOS PRODUCT CENTER)	●
SURVEILLANCE & MOBILITY	
GRM	●

TECHNICAL DATA **SP SUBMERSIBLE PUMPS**

The following is an overview of the SP system's technical specifications. Complete documentation is available in data booklets, or from the Grundfos Product Center. To access full information online, follow the link from www.grundfos.com



TECHNICAL DATA **MS/MMS MOTORS**

	MS 402	MS 4000
Phase	1 and 3 phase	1 and 3 phase
Start/run methods	1 phase: PSC, 2W, 3W	1 phase: 3W
3 phase	DOL	DOL
Frequency	50 Hz and 60 Hz	50 and 60 Hz
Voltage	115-575 V	208-575 V
Thrust load	Max. 3.5 kN	2.2 kN or 4.4 kN
Efficiency	57-77	75-81
Insulation class	B	F
Ambient temperature	See Grundfos documentation	See Grundfos documentation
Mechanical connection	4" Nema flange	4" Nema flange
Material	Stainless steel EN 1.4301 (AISI 304)	Stainless steel EN 1.4301 (AISI 304) + EN 1.4539 (AISI 904L)
Certification	CE, some variants also carry the UL mark	CE, some variants also carry the CSA mark

	MS 6000	MMS
Phase	3 phase	3 phase
Start/run methods	DOL, SD	DOL, SD
Frequency	50 and 60 Hz	50 and 60 Hz
Voltage	200-575 V	200-1000 V
Thrust load	7.5 kN, 27 kN or 40 kN	6", 15 kN or 27.5 kN 8" and 10", 50 kN 12", 70 kN
Efficiency	81-86	70-91
Insulation class	F	A
Ambient temperature	See Grundfos documentation	See Grundfos documentation
Mechanical connection	6" Nema flange.	6" and 8" with Nema flange
Material	Stainless steel EN 1.4301 (AISI 304) + EN 1.4539 (AISI 904L)	Stainless steel EN 1.4301 (AISI 304) stator tube with cast iron endbells EN-JL-1040, all-stainless steel EN 1.4401 (AISI 316L), or all-stainless steel EN 1.4539 (AISI 904L)
Certification	CE or cCSAus	CE

MIX
Paper from responsible sources
FSC® C009911

THE SP SYSTEM

A complete Grundfos submersible system consists of an SP pump, a dedicated motor, a frequency drive and monitoring. Every component is designed to work perfectly together to ensure reliable performance and high energy efficiency.

Grundfos offers decades of submersible experience and comprehensive application know how within water supply, irrigation and mining.

For more information on the benefits of a complete SP system please visit **grundfos.com**

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