

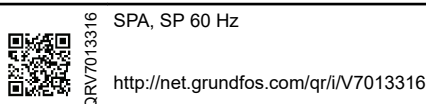
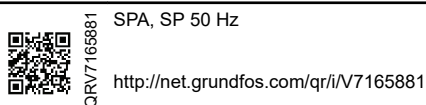


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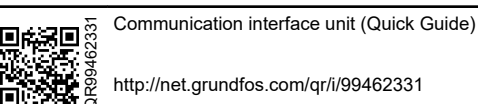
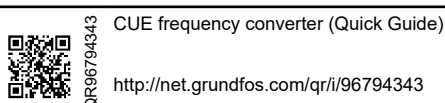
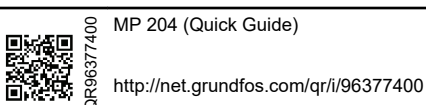
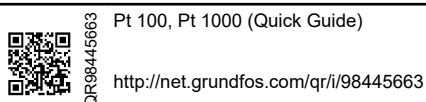
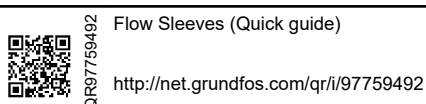
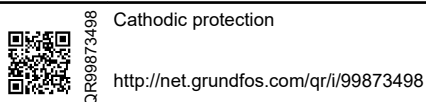
1. General description

This data booklet contains information on SP accessories.

For pump-related information, see the SP data booklets:



For accessory-related mounting instructions, see quick guides:



2. SP installations

SP pumps are primarily used to pump raw water from underground. The pumps are installed in boreholes or wells, submerged below the water level.

For industrial purposes, the pump can be placed, for example, in a tank.

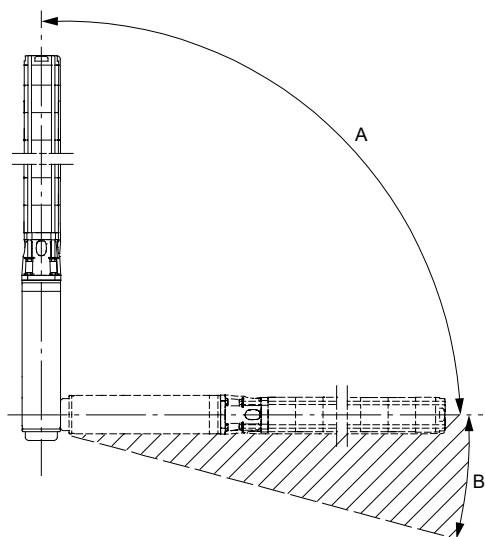
SP pumps are suitable for the following applications:

- raw-water supply
- irrigation
- groundwater lowering
- pressure boosting
- fountain applications
- mining applications
- off-shore applications.

Vertical or horizontal installation

Depending on the motor type, the pump can be installed either vertically or horizontally.

If the pump is installed horizontally, make sure that the outlet port never falls below the horizontal plane.



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Positional requirements

Pos.	Description
A	Allowed
B	Not allowed

If the pump is installed horizontally, use a flow sleeve. See section 5. Flow sleeves.

Related information

[5. Flow sleeves](#)

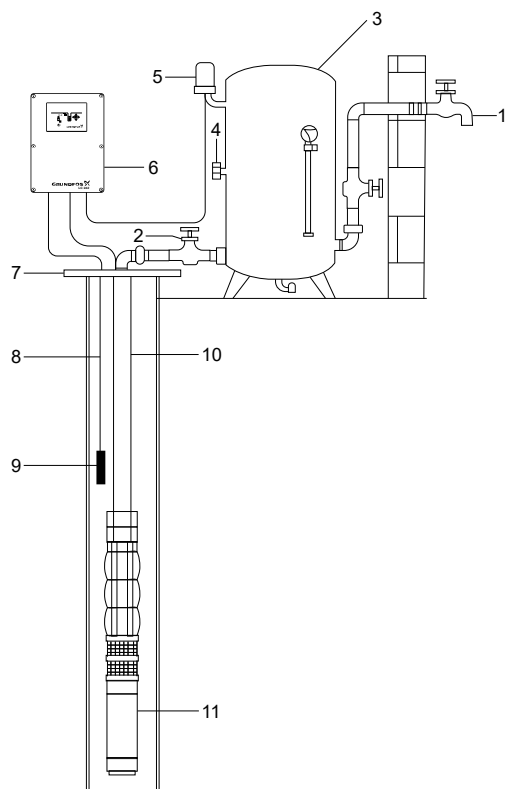
Motors suitable for horizontal installation

The below motors are suitable for horizontal installation:

Motor	Output power 50 Hz	Output power 60 Hz
	[kW]	[kW]
MS	All sizes	All sizes
MMS6	5.5 - 37	5.5 - 37
MMS 8000	22-97	22-97
MMS 10000	75-170	75-170
MMS 12000	147-190	-

Constant pressure with pressure switch and pressure tank

SP is suited for water supply through a pressure tank for household-farms not connected to municipal waterworks. The pressure tank stores the water and keeps water pressure constant.



Domestic water supply

Pos.	Description
1	Tap
2	Check valve
3	Pressure tank
4	Pressure gauge
5	Pressure switch
6	<i>LC 232 and LC 242</i>
7	Well head
8	Sensor cable
9	Level sensor
10	Riser pipe
11	SP pump

Related information

LC 232 and LC 242

Function

The pressure tank stores the water and keeps it at constant pressure.

When a tap is opened, the pressure in the tank starts to drop. When the pressure in the tank drops below the setpoint, the pressure switch automatically starts the pump. The SP well pump refills the tank and restores the pressure in it.

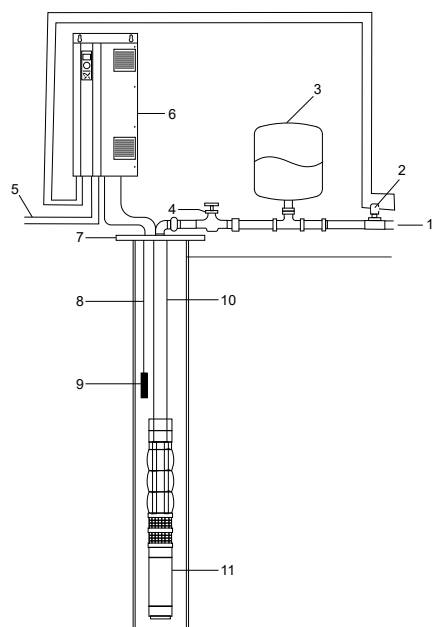
If there is a continued need for waterflow, the well pump will continue to run until the tap is turned off. If a small amount of water is needed, the pressure tank can supply a few litres (depending on tank size) without restarting the well pump.

The amount of water supplied without restarting can be checked by turning on one tap only and turning it off when the pump starts. If the pump runs immediately each time a tap is turned on, the tank may need to be re-pressurised.

Constant pressure with pressure sensor, Variable Frequency Drive and pressure tank

Constant pressure pumps provide an even water pressure.

Constant pressure controllers use state-of-the-art technology to provide constant water pressure through variable speed control of submersible water well pumps.



TM079124

Constant pressure with pressure sensor/VFD

Pos.	Description
1	Output
2	Pressure sensor
3	Pressure tank
4	Check valve
5	Power supply
6	<i>CUE frequency converter</i>
7	Well head
8	Sensor cable
9	Level sensor
10	Riser pipe
11	SP pump

Related information

CUE frequency converter

Benefits

Simultaneous water consumption at different units could result in a loss of water pressure. The shower may sputter, the washing machines may take longer to fill, water may flow slowly out of the taps. With a constant pressure pump. Simultaneous water consumption does not lower the water pressure.

Function

The SP constant pressure system consists of a pump, a motor, a drive, a pressure tank and a sensor. Water pressure is detected by a pressure sensor, sending a signal to the controller to adjust the pump speed.

Instead of the pump turning on and off when the pressure tank reaches a certain pressure, it keeps the pressure tank at a constant pressure level. It results in a steady water flow.

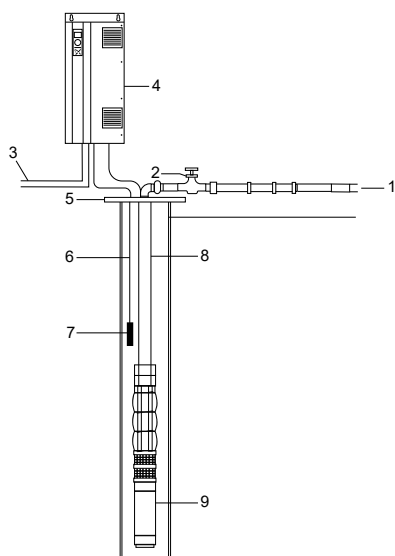
The pump speed increases or decreases in proportion to the level of water demand. This eliminates the need for large pressure tanks.

Constant flow with Variable Frequency Drive and flow sensor

Features and benefits

Constant water flow can be maintained by adjusting pump performance. Maintaining constant water flow is important, for example, in connection with keeping out the groundwater of a building site, or preventing the penetration of salt water into a borehole containing potable water.

The figure below shows how to maintain constant water flow by adjusting pump performance.



Constant pressure with pressure sensor and Variable Frequency Drive

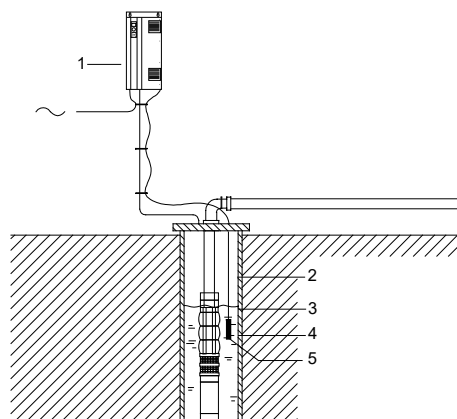
Pos.	Description
1	Output
2	Check valve
3	Power supply
4	CUE frequency converter
5	Well head
6	Sensor cable
7	Flow sensor
8	Riser pipe
9	SP pump

Constant level with Variable Frequency Drive and level sensor

Constant water level can be maintained by connecting an analog level sensor to adjust the pump performance. Maintaining a constant water level is important, for example, in connection with keeping out the groundwater of a building site, or preventing the penetration of salt water into a borehole containing potable water.

The figure below shows an example of an installation designed for maintaining constant water level in a borehole.

Level	Description	Reaction
Level sensor		
Warning (max.)	Too high water level. Possible cause: insufficient pump capacity.	Alarm relay operates.
Desired level	The water level that must be maintained.	
Warning (min.)	Too low water level. Possible cause: too high pump capacity.	Alarm relay operates.



Constant water level with Variable Frequency Drive and level sensor

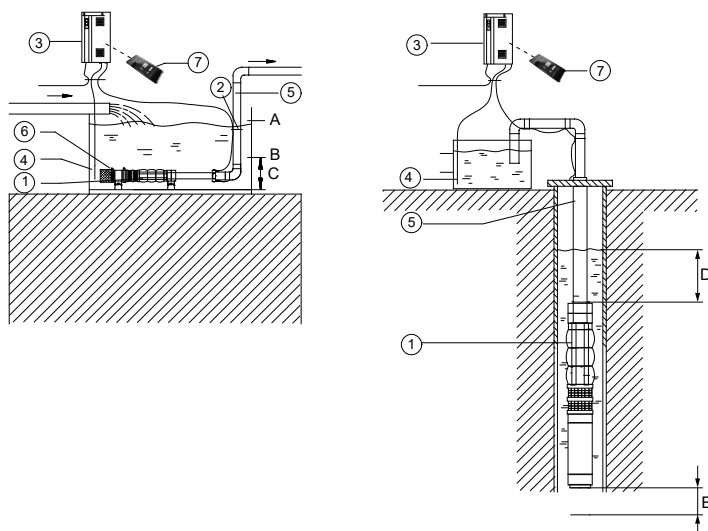
Pos.	Description
1	CUE frequency converter
2	Warning (high water level)
3	Desired level
4	Warning (low water level)
5	Level sensor

Related information

[CUE frequency converter](#)

Emptying or filling a tank

SP pump with a CUE frequency converter can empty or fill a tank.



TM081433

Emptying or filling a tank

Pos.	Description
1	SP pump
2	Cable clips
3	CUE frequency converter
4	Level sensor
5	Riser pipe
6	Flow sleeve with strainer and supporting brackets
7	Grundfos GO Remote
A	Max. (start)
B	Min. (stop)
C	Recommended min. 0.5 m
D	Recommended min. 0.5 m
E	Min. 0.5 m

Related information

[CUE frequency converter](#)

[Grundfos GO Remote](#)

3. Electrical accessories

LC 232 and LC 242

The level-control unit is designed to control one or two pumps. The product can be configured for two purposes: dewatering in groundwater supply or filling a tank.

The control unit switches the pump on and off according to the liquid level measured by level switches or a pressure sensor.

Level control:

- When the start level is reached, the pump starts, and when the liquid level is lowered to the stop level, the LC control unit stops the pump.

Pressure control:

- When the start pressure is reached, the pump starts, and when the liquid level is lowered to the stop level, the LC control unit stops the pump.

An alarm is indicated in case of, for example, high water level in the tank or sensor failure. The control unit is available in two variants:

- LC 232 provides a compact solution with integrated motor protection.
- LC 242 is a cabinet solution that allows setup customisation.

For further information, see LC232-LC 242 Data booklet.

LC 232 is a compact solution with certified motor protection and current measurement.

It is available in two versions:

- single pump
- dual pump.



TM078912



TM078913

LC 232 single pump version

LC 232 dual pump version

LC 242 is a control cabinet solution, and it can be customised to meet specific demands. It offers motor protection through an electronic DIN rail.

It is available in two versions:

- single pump
- dual pump.



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TM076190

LC 242 single pump version

LC 242 dual pump version

Application

LC 232 and LC 242 can be used for the following applications:

- groundwater supply
- irrigation systems
- small waterworks
- mining and construction sites
- commercial buildings
- municipal systems.

Overview of the LC range

Parameters	LC 232	LC 242
Single pump unit	•	•
Dual pump unit	•	•
1 × 230 V 50/60 Hz	•	•
3 × 230/400 V 50/60 Hz	•	•
Direct Online (DOL)	Up to 12 A	Up to 26 A
Star Delta (YD)		Up to 65 A
Soft Starter (SST)		Up to 72 A
Start and run capacitor		•
Option CT ¹⁾		•
Option E ²⁾		•
Option F ³⁾		•
Option M ⁴⁾		•

1) Current transformer

2) Main disconnect switch

3) Circuit breaker per pump

4) IO 241

For detailed information about product numbers, see LC 232-LC 242 Data booklet on Grundfos Product Center.

Function

The control unit LC 232 and LC 242 have a wide range of pump-specific functions, such as the following:

- level control
- tank filling
- dewatering
- constant pressure.

For further information, see LC 232-LC242 Data booklet on Grundfos Product Center.

MP 204 motor protector



TM055456

MP 204 motor protector

MP 204 is an electronic motor protector designed for protecting an asynchronous motor or a pump.

The motor protector cannot be used in installations where a frequency converter is installed.

The motor protector operates with two sets of limits:

- a set of warning limits
- a set of trip limits.

If one or more of the warning limits are exceeded, the motor continues to run, but the warnings appear in the display of the motor protector.

Some values only have a warning limit.

Warnings are detailed on Grundfos GO.

If one of the trip limits is exceeded, the trip relay stops the motor. At the same time, the signal relay is operating to indicate that the limit is exceeded.

Applications

MP 204 can be used as a stand-alone motor protector. The motor protector can be monitored through a Grundfos GENIbus.

The motor protector protects the motor primarily by measuring the motor current with a true RMS measurement.

The motor protector is designed for single- and three-phase motors. In single-phase motors, the starting and run capacitors are also measured. $\cos \varphi$ is measured in both single- and three-phase systems.

Benefits

The motor protector offers the following benefits:

- suitable for both single- and three-phase motors
- dry-running protection
- overload protection
- very high accuracy
- made for submersible pumps.
- monitor motor temperature with motor cable (only motors with Tempcon sensor).

Monitoring options of the motor protector

The motor protector monitors the following parameters:

- insulation resistance before startup
- temperature (Tempcon, Pt sensor and PTC/thermal switch)
- overload and underload
- overvoltage and undervoltage
- phase sequence
- phase failure
- power factor
- power consumption
- harmonic distortion
- operating hours and number of starts.

Note: Monitoring of motor temperature is not possible when using single-turn transformers.



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Single-turn transformers

Product numbers, MP 204

Product	Product number
MP 204	96079927
Single-turn transformers	
Current transformer ratio: 200:5, $I_{max.} = 120$ A	96095274
Current transformer ratio: 300:5, $I_{max.} = 300$ A	96095275
Current transformer ratio: 500:5, $I_{max.} = 500$ A	96095276
Current transformer ratio: 750:5, $I_{max.} = 750$ A	96095277
Current transformer ratio: 1000:5, $I_{max.} = 1000$ A	96095278

Technical data, MP 204

Enclosure class	IP20
Ambient temperature	-20 to +60 °C
Relative humidity	99 %
Voltage range	100-480 VAC
Current range	3-999 A
Frequency	50 to 60 Hz
IEC trip class	1-45
Special Grundfos trip class	0.1 - 30 s
Voltage variation	-25 % or +15 % of rated voltage
Approvals	EN 60947, EN 60335, UL/CSA 508
Marking	CE, cUL, C-tick
Consumption	Maximum 5 W
Plastic type	Black PC/ABS

Electrical data, MP 204

	Measuring range	Accuracy	Resolution
Current without external current transformers	3-120 A	± 1 %	0.1 A
Current with external current transformers	120-999 A	± 1 %	1 A
Phase-to-phase voltage	80-610 VAC	± 1 %	1 V
Frequency	47-63 Hz	± 1 %	0.5 Hz
Power	0-1 MW	± 2 %	1 W
Power factor	0 - 0.99	± 2 %	0.01
Energy consumption	0-4 × 10 ⁹ kWh	± 5 %	1 kWh

For further information about MP 204 and pump controls, see [Grundfos Product Center](#).

CUE frequency converter



TM075268

The CUE range

Grundfos CUE is a series of external frequency converters designed for speed controlling a wide range of Grundfos pumps.

CUE offers quick and easy setup and commissioning due to the startup guide. Type in application-specific variables, such as motor data, pump family, control function, sensor type and setpoint, on the display panel, and the CUE automatically sets all necessary parameters.

The CUE regulates the operation of the pump by making the fluctuation of the water flow constant. This prevents water hammer and protects the water reservoir and the rest of the distribution system.

When a CUE is installed, the motor does not require further overload protection. If needed, a Pt100 or Pt1000 together with the MCB 114 provide overhear protection for the motor windings.

If the motor has a built-in Tempcon sensor, this sensor is disconnected when it is exposed to the frequency converter drive. An internal fuse in the motor melts and it cannot be replaced. The motor works without the sensor, but it is not possible to restore the functionality of the Tempcon sensor.

Overview of the CUE range

Supply voltage [V]	Power range [kW (hp)]							
	0.55 (0.75)	0.75 (1)	1.1 (1.5)	7.5 (10)	11 (15)	45 (60)	90 (125)	250 (350)
3 × 525-690					•	•	•	•
3 × 525-600		•	•	•				
3 × 380-500	•	•	•	•	•	•	•	•
3 × 200-240		•	•	•	•	•		
1 × 200-240			•	•				

CUE is available in two enclosure classes:

- IP20/21
- IP54/55.

RFI filters

To meet the EMC requirements, CUE comes with the following types of built-in radio frequency interference filter (RFI).

Voltage [V]	Typical shaft power, P2 [kW (hp)]	RFI filter type	Application
1 × 200-240	1.1 - 7.5 (1.5 - 10)	C1	Domestic
3 × 200-240	0.75 - 45 (1-60)	C1	
3 × 380-500	0.55 - 90 (0.75 - 125)	C1	Domestic and industry
	110-250 (150-350)	C3	
3 × 525-600	0.75 - 90 (1-125)	C3	Industry
3 × 525-690	11-250 (15-350)	C3	

Functions

CUE has a wide range of pump-specific functions, such as the following:

- constant pressure
- constant level
- constant flow rate
- constant temperature
- constant curve.

Inputs and outputs

CUE is equipped with a number of inputs and outputs:

- 1 RS-485 GENIbus connection
- 1 analog input, 0-10 V, 0/4-20 mA
 - external setpoint
- 1 analog input, 0-10 V, 0/4-20 mA
 - sensor input, feedback sensor
- 1 analog output, 0-20 mA
- 6 digital inputs
 - 2 inputs can be changed to digital outputs
 - all digital inputs and outputs are programmable
- 2 signal relays (C/NO/NC)
 - programmable.

CUE features

- startup guide.
CUE incorporates an innovative startup guide for general setup including the setting of the correct direction of rotation. The startup guide is started the first time CUE is connected to the power supply.
- checking the direction of rotation.
- duty and standby operation.
- dry-running protection.
- low-flow stop function.

Startup guide

CUE has a startup guide, which starts at the first startup. Here, a number of parameters are set automatically based on the pump type. Other parameters are set manually based on the data on the motor and pump nameplates. The startup guide can be repeated, if necessary.

The startup guide allows the installer to quickly set central parameters and put CUE into operation.

Direction of rotation test

During the startup guide, CUE automatically tests and sets the correct direction of rotation without changing the cable connections if a pressure/flow sensor is connected. The direction of rotation test is performed manually if no sensor is connected.

Duty/standby

The duty/standby function is used to alternate between two pumps. Each pump is connected to a CUE unit. The primary task is to start the standby pump if the duty pump is stopped due to an alarm and to alternate the two pumps at least every 24 hours.

The duty/standby operation increases the security of supply and ensures that the standby pump does not get stuck.

Duty/assist

The duty/assist function is used to cascade additional pumps. Each pump is connected to a CUE unit.

The cascade control ensures that the pump performance is automatically adapted to consumption by switching on or off pumps and by changing their speed during operation. The system runs as energy-efficiently as possible with a limited number of pumps.

When more than one pump is running in steady state, the pumps run at the same speed and are controlled by the PI controller of the master pump. As a standard, the pump with the lowest number is the master pump.

Dry-running protection

To protect the pump, select the dry-running function with an external sensor so the lack of inlet pressure or water shortage can be detected.

Low-flow stop function

In constant pressure or constant level control mode, the stop function is used for changing between on/off operation at low-flow rate and continuous operation at high-flow rate.

The low-flow stop function protects the pump and saves energy.

Monitoring of the motor bearing lubrication

When the bearing monitoring function is active, a warning appears on the display that the motor bearings are to be lubricated or replaced.

Accessories for CUE

Grundfos offers various accessories for CUE. For further details, see the next topics or the CUE frequency converter data booklet.

Sensors

The following sensors can be used in connection with CUE.

- pressure sensors, up to 25 bar
- temperature sensors
- differential-pressure sensors
- differential-temperature sensors
- flowmeters
- potentiometer box for external setpoint setting.

MCB 114 sensor input module

MCB 114 offers additional analog inputs for CUE:

- 1 analog input, 0-20 mA or 4-20 mA
- 2 inputs for Pt100 and Pt1000 temperature sensors.

Output filters

Output filters protect the motor from overvoltage and increased operating temperature. The filters reduce voltage stress on the motor windings and stress on the motor insulation system. The filters also decrease acoustic noise from the frequency converter-driven motor. Grundfos offers two types of output filters as CUE accessories:

- dU/dt filters
- sine-wave filters.

dU/dt filters

dU/dt filters reduce the voltage peaks and dU/dt of the pulses at the motor terminals. The voltage at the motor terminals is pulse-shaped; the motor current has a sine-wave shape without commutation spikes.

Sine-wave filters

Sine-wave filters have a higher degree of filtering, resulting in high reduction of motor insulation stress and elimination of switching acoustic noise from the motor. The motor losses are reduced as the motor is fed with a sine-wave voltage and the filter eliminates the pulse reflections in the motor cable.

Use of output filters

The table below shows in which cases an output filter is required. It indicates if a filter is needed and which type to use. **Always use sine-wave filters for a Submersible installation.**

The selection depends on the following factors:

- pump type
- motor cable length
- the required reduction of acoustic noise from the motor.

Pump type	Motor type	dU/dt filter [motor cable length]	Sine-wave filter [motor cable length]
SP with up to 380 V motor	MS, MMS	0-100 m	0-300 m
SP with above 380 V motor	MS, MMS	NA	0-300 m

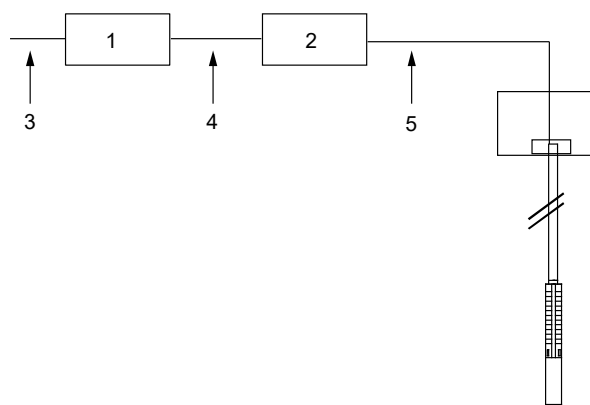
Cables used in CUE installations

When the CUE is installed for SP pumps, two installation types are distinguished:

- installation in EMC-insensitive sites
- installation in EMC-sensitive sites.

The two installation types differ in the use of screened cable.

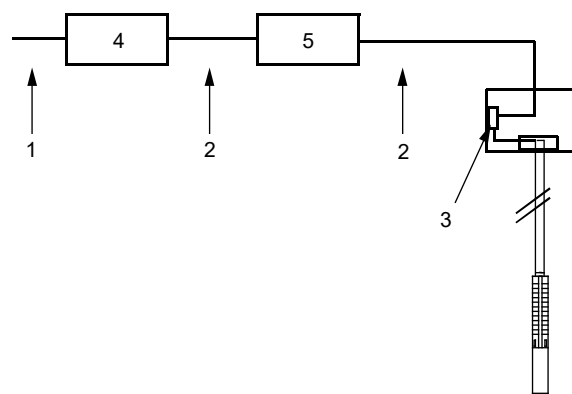
Drop cables are always unscreened.



TM044296

Example of installation in EMC-insensitive sites

Pos.	Description
1	CUE
2	Sine-wave filter
3	Mains cable, unscreened
4	Screened cable
5	Drop cable, unscreened



TM1040326

Example of installation in EMC-sensitive sites

Pos.	Description
1	Mains cable, unscreened
2	Screened cable
3	Connection box
4	CUE
5	Sine-wave filter

Screened cables are required in those parts of the installation where the surroundings must be protected against EMC.

The CUE has a startup guide that takes the installer through all the necessary settings.

Issues to be considered when using CUE in SP installations

The table below lists the different issues to be considered when using frequency converters in SP installations.

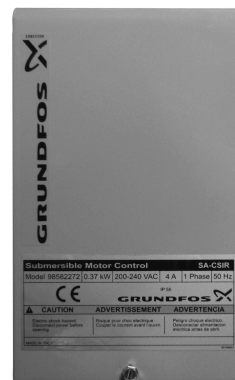
Issues to be considered	Explanation
Observe the ramp times (up and down): maximum 3 seconds.	The journal bearings must be lubricated to limit wear and overheating of the windings.
Use temperature monitoring by a Pt sensor.	Overheating of the motor causes low insulation resistance, which results in sensitivity to voltage peaks. Tempcon sensors do not work with frequency converter operation.
Reduce peak voltages (max. 800 V peaks).	Never exceed peak voltages of 850 V at motor leads.
For MS and MMS, use motors with 10 % extra in given duty point. For MMS, always use motors wound PE2-PA.	Use output filter.
Remember the output filter.	Cables act as an amplifier, so measure peaks at the motor.
Rise time (dU/dt) must be limited to a maximum of 1000 V/μs. The rise time is determined by the equipment in the CUE.	Time between switches is an expression of losses, therefore, 1000 V/μs must not be exceeded. Filter in the output from the CUE instead of applying higher insulation of the motor.
Keep constant operation at minimum 30 Hz. Use a 60-Hz motor for larger ranges.	Too low speed results in low flow and poor lubrication of journal bearings.
Size the CUE with respect to the current, not the power output.	Too small CUE should be avoided.
Size cooling provision for stator tube at duty point with the lowest flow rate.	Minimum flow along the stator housing must be taken into consideration.
Ensure that the pump is used within the range of the pump curve.	Focus on outlet pressure and sufficient NPSH as vibrations may damage the motor.

For further information about frequency converters, see [CUE frequency converter data booklet](#).

Motor starters for MS402 and MS4000 CSIR/CSCR 50 Hz motors

Applications

SA-SPM control boxes are used as starting units for single-phase 200-240 V 3-wire MS402/MS/4000 motors.



TM064358

Motor starter for MS 402 and MS 4000

Product numbers

	Product number	CS [μF]	CR [μF]
Motor starter - CSIR - 0.37 kW	98582272	65	-
Motor starter - CSIR - 0.55 kW	98582277	98	-
Motor starter - CSIR - 0.75 kW	98582295	119	-
Motor starter - CSCR - 1.1 kW	98582296	143	40
Motor starter - CSCR - 1.5 kW	98582381	160	50
Motor starter - CSCR - 2.2 kW	98582401	268	60

PSC motor capacitors

The MS 402 and MS 4000 single-phase, 3-wire, PSC motors must be connected to the mains through a motor capacitor that is permanently connected during operation.

Product numbers

Capacitors for MS 402 PSC and MS 4000 PSC		
Capacitor size	Power [kW]	Capacitor
16 μF, 400 V, 50 Hz	0.37	96279800
20 μF, 400 V, 50 Hz	0.55	96279732
30 μF, 400 V, 50 Hz	0.75	96279808
40 μF, 400 V, 50 Hz	1.1	96279810

Grundfos GO Remote



TM069768

The pump is designed for wireless communication with the Grundfos GO Remote app which communicates with the pump through radio communication.

The Grundfos GO Remote app is available from Apple App Store (iOS) and Google Play Store (Android).

The Grundfos GO Remote app must be used in conjunction with a mobile interface device, for example:

Mobile interface	Product number
Grundfos MI 301	98046408

The Grundfos GO Remote concept replaces the Grundfos R100 remote control. This means that all products supported by the R100 are supported by Grundfos GO Remote.

For function and connection to the pump, see the separate installation and operating instructions for the desired type of Grundfos GO Remote setup.

CIU communication interface units



TM078946

Grundfos CIU communication interface unit

The Communication Interface Unit (CIU) enables data communication through open and interoperable networks, such as:

- Profibus DP
- Profinet
- Modbus RTU
- Modbus TPC
- LonWorks
- BACnet MS/TP
- BACnet/IP
- EtherNet/IP
- Cellular connection
- GiC/GRM.

Applications

The range of Grundfos communication interface offers easy installation and commissioning, as well as user-friendliness. All units are based on standard functional profiles for an easy integration into the network.

The CIM/CIU units enable communication of operating data, such as measured values and setpoints, between pumps and PLCs, SCADA system and building management system.

Benefits

CIM/CIU offers the following benefits:

- open communication standards
- complete process control
- one concept for Grundfos products
- 24-240 VAC/DC power supply in CIM/CIU modules
- simple configuration and easy to install
- prepared for DIN rail or wall mounting.

For data communication between an SP pump and a main network, a CIM/CIU has to be used with a Cue frequency converter, an MP 24 motor protector or an LC 232 and LC 242 level control unit.



TM080034

MP 204 motor protector, CUE frequency converter and LC 232/242 level control unit

Fieldbus support for products

Fieldbus protocol	CUE	MP 204	LC232	LC242	CIU 900/901	CIM module
GENI	Built in	Built in	CIM	CIM	-	CIM 050 - 96824631
LonWorks	CIM + CIU	-	-	-	CIU 900 - 99448387	CIM 100 - 96824797
PROFIBUS D	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 150 - 96824793
Modbus RTU	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 200 - 96824796
Cellular connection EU	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 260 - 99439302
Cellular connection US	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 260 - 99439306
GiC/GRM ⁵⁾ EU	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 280 - 99439724
GiC/GRM ⁵⁾ US	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 280 - 99439725
GiC/GRM ⁵⁾ + extra I/O EU	CIM + CIU	CIM + CIU	-	-	CIU 901 - 99448389	CIM 280 - 99439724
GiC/GRM ⁵⁾ + extra I/O US	CIM + CIU	CIM + CIU	-	-	CIU 901 - 99448389	CIM 280 - 99439725
BACnet MS/T	CIM + CIU	-	CIM	CIM	CIU 900 - 99448387	CIM 300 - 96893770
Profinet IO	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 500 - 98301408
Modbus TCP	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 500 - 98301408
BACnet TCP	CIM + CIU	-	CIM	CIM	CIU 900 - 99448387	CIM 500 - 98301408
EtherNet/IP	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 500 - 98301408
GiC/GRM ⁵⁾	CIM + CIU	CIM + CIU	CIM	CIM	CIU 900 - 99448387	CIM 500 - 98301408

⁵⁾ Grundfos iSOLUTIONS Cloud (GiC) and Grundfos Remote Management (GRM) are easy-to-install, low-cost solutions for wireless monitoring and management of Grundfos products.

If CIM and CIU are used together, then mount the CIM module inside CIU upon installation. For products with integrated CIM support, mount the CIM directly into the product during installation.

Antennas for CIU 260 and 280

Accessories	Product number	Description
Antenna for CIM 260/280 EU	99518079	puc antenna, 1.5 m cable
Optional battery for CIM 260/280 EU/US	99499908	to get alarm in case of power break

For further information about data communication through CIU and fieldbus protocols, see the CIU documentation available at [Grundfos Product Center](#).

Related information

[LC 232 and LC 242](#)

[MP 204 motor protector](#)

[CUE frequency converter](#)

Analog level sensors



TM077248

Level transmitters, S (Standard), E (Endurance), W (Waste water special)

Analog level sensors

Description								
Product name	Product type	Measuring range, metre of water column	Cable length	Cable surface material	Seal material	Hydraulic port configuration	Drinking water approval	Product number
Level transmitter	S ⁶⁾	0-3 m	c10 m	P ⁷⁾	V ⁸⁾	BO ⁹⁾		99488544
Level transmitter	S ⁶⁾	0-5 m	c10 m	P ⁷⁾	V ⁸⁾	BO ⁹⁾		99488545
Level transmitter	S ⁶⁾	0-5 m	c25 m	P ⁷⁾	V ⁸⁾	BO ⁹⁾		99488546
Level transmitter	404393 ¹⁰⁾	0-5 m	c25 m	F ¹¹⁾	C ¹²⁾	BC ¹³⁾	EX1 ¹⁴⁾	99488548
Level transmitter	S ⁶⁾	0-10 m	c25 m	P ⁷⁾	V ⁸⁾	BO ⁹⁾		99488552
Level transmitter	S ⁶⁾	0-2 m	c10 m	P ⁷⁾	V ⁸⁾	BO ⁹⁾		99488553
Level transmitter	E ¹⁵⁾	0-10 m	c100 m	E ¹⁶⁾	E ¹⁷⁾	BC ¹³⁾	DWA ¹⁸⁾	99488564
Level transmitter	E ¹⁵⁾	0-50 m	c60 m	E ¹⁶⁾	E ¹⁷⁾	BC ¹³⁾	DWA ¹⁸⁾	99488565
Level transmitter	E ¹⁵⁾	0-50 m	c100 m	E ¹⁶⁾	E ¹⁷⁾	BC ¹³⁾	DWA ¹⁸⁾	99488566
Level transmitter	E ¹⁵⁾	0-100 m	c125 m	E ¹⁶⁾	E ¹⁷⁾	BC ¹³⁾	DWA ¹⁸⁾	99488567
Level transmitter	E ¹⁵⁾	0-160 m	c200 m	E ¹⁶⁾	E ¹⁷⁾	BC ¹³⁾	DWA ¹⁸⁾	99488568
Level transmitter	E ¹⁵⁾	0-5 m	c25 m	F ¹¹⁾	V ⁸⁾	BO ⁹⁾		99488549
Level transmitter	E ¹⁵⁾	0-100 m	c200 m	PPE ¹⁹⁾	EPDM		For drinking water	On request
Level transmitter	W ²⁰⁾	0-5 m	c25 m	P ⁷⁾	V ⁸⁾	BO ⁹⁾		99488550
Level transmitter	junction box							99488577
Level transmitter	cable hanger							99488578

⁶⁾ S: standard is the general purpose and recommended choice for level measurements requiring less than 50 m measuring range.

⁷⁾ P: PE-LD (low-density polyethylene)

⁸⁾ V: FKM (fluoroelastomer or FKM is a class of synthetic rubber designed for very high temperature operation)

⁹⁾ BO: bottom open for waste water

¹⁰⁾ 404393 is the dedicated purpose transmitter recommended for level measurements requiring EX (explosives) Approval or for usage in harsh chemicals.

¹¹⁾ F: FEP (fluorinated ethylene propylene)

¹²⁾ C: PTFE (polytetrafluoroethylene)

¹³⁾ BC: bottom closed for clean water

¹⁴⁾ for level measurements requiring explosives or for usage in harsh chemicals

¹⁵⁾ E: endurance. It is the recommended choice for level measurements requiring more than 50 m measuring range.

¹⁶⁾ E: EPR (ethylene propylene rubber)

¹⁷⁾ E: EPDM (ethylene propylene diene monomer rubber, one of the most water-resistant types of synthetic rubber)

¹⁸⁾ DWA: drinking water additives

¹⁹⁾ PPE: personal protective equipment

²⁰⁾ W: waste water special. It is recommended for particular difficult waste water and harsh chemical level measurements requiring less than 50 m measuring range.

Level switches



TM016982

Float switch or level switch

Float switches for level control in tanks, pumping stations or similar applications.

The MS1 float switches are ON/OFF switches designed for use in pumping stations which handle liquids polluted with solids. It is resistant to a wide range of liquids.

Level switches

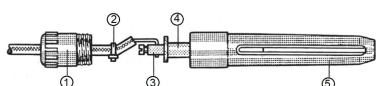
Description	Product number
Level switch MS1, 10 m cable	96003332
Level switch MS1, 20 m cable	96003695
Level switch MS1, 30 m cable	91073205
Level switch M2, 10 m cable	91427146
Level switch MS1 ACS, 10 m cable	99023672
Weight of 300 g for cable stabilising	96003337



TM079648

Cable stabilising counterweight

Electrode



TM081932

Suspension electrode

Pos.	Description
1	Locking cap
2	Strain relief tape
3	Connecting terminal
4	Electrode
5	Protective cover

Electrode

Description	Product number
Electrode (2 pcs)	115041
Cable for electrode	00ID8240

PR 5714 with Pt100 sensor



TM078953

PR 5714 with Pt100 sensor

PR 5714 with Pt100 sensor offers the following features:

- continuous monitoring of the motor temperature
- protection against high temperature.

Protecting the motor against high motor temperature prevents motor life reduction. The Pt100 sensor ensures that the operating conditions are not exceeded and indicates when it is time for service of the motor.

Monitoring and protection by a Pt100 require the following parts:

- Pt100 sensor
- PR 5714 relay
- cable.

The following temperature limits are preset on delivery:

- 60 °C warning limit
- 75 °C stop limit.

To set the warning limit, observe the temperature at normal operation and add 5 °C. Additionally add 5 °C for stop limit.

Technical data

	PR 5714
Enclosure class	IP65 (fitted in a control panel)
Ambient temperature	-20 °C to +60 °C
Relative humidity	95 % (condensating)
Voltage variation	1 × 24-230 VAC ± 10 %, 50-60 Hz 24-250 VDC ± 20 %
Approvals	UL, DNV
Marking	CE

PR 5714 relay	Voltage	Product number
	24-230 VAC, 50/60 Hz / 24-250 VDC	96913234

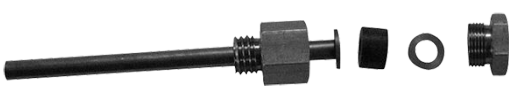
TM078952

Pt100 sensor, including cable for standard-, N- and R-versions	Cable length [m]	Product number
	20	96913237
	40	96913253
	60	96913256
	80	96913260
	100	96913263

TM078951

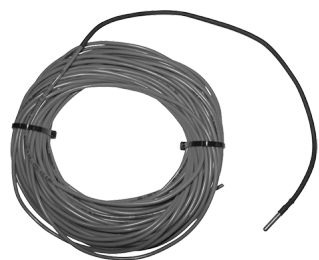
Staybolt kits for Pt100 in MS 6000	Description	Product number
	Staybolt kit for Pt100 / Pt1000. Material: EN 1.4401 / AISI 316.	97550639
	Staybolt kit for Pt100. Material: EN 1.4539 / AISI 90L.	96803373

TM078950

Insertion probe for MMS 10000 and MMS 12000 ²¹⁾	Description	Product number
	Insertion probe for Pt100 / Pt1000 in MMS 10000 and MMS 12000. Material: EN 1.4401 / 316 (N-version).	96913215
	Insertion probe for Pt100 / Pt1000 in MMS 10000 and MMS 12000. Material: EN 1.4539 / AISI 904L (R-version)	99298250

TM043560

²¹⁾ MMS6000 and MMS8000 do not need this product.

Pt1000 sensor, including cable	Cable length [m]	Product number
	20	96804042
	40	96804044
	60	96804064
	80	96804065
	100	96804067

TM043563

Staybolt kits for Pt1000 in MS 402 and MS 4000 ²²⁾	Description	Product number
	Staybolt kit for Pt1000. Material: EN 1.4401 / AISI 316.	98090278
	Staybolt kit for Pt1000. Material: EN 1.4539 / AISI 904.	98090341

TM053694

²²⁾ MMS6000 and MMS8000 do not need this product.

Extension kit for sensor cable for Pt100/Pt1000	Description	Product number
	TM007885 Extension kit for Pt100/Pt1000 sensor cable. For watertight shrink-joining of the sensor cable. Extra sensor cable must be ordered separately.	99039717
Sensor cable	Description	Product number
	TM007882 Drop cable for extension: 4 × 1 mm² Mention length when ordering. Maximum recommended length: 350 m. If an extension is needed on a sensor cable, extend it 0.5 m after the pump outlet.	00RM5271

MS motor cables

See the following tables for information about additional motor cables for the MS 402, MS 4000, and MS 6000 range.

Drinking water approval

TML-B cables are drinking water compatible with ACS approvals.

For more information on sizing cables, see section 11. Cable sizing.

Note: The maximum permissible voltage drop in the motor cable is 3 %.

Note: Always dimension motor cables that are not submerged in the pumped liquid as submersible drop cables.

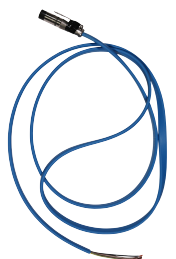
Related information

[11. Cable sizing](#)

MS 402 three-phase motor cables

TML-B motor cables with EPR outer sheath (ethylene propylene rubber)						
Product	Motor type	Length [m]	Plug steel grade	Cross-section [mm ²]	Plug for drop cable	Product number
	MS 402	10	Standard	4 G 1.5	No	00795752
		15				00795753
		20				00795754
		30				00795755
		40				00798890
		50				00795800
		60				98115565
		70				98162757
		80				98162787
		90				98162790
		110				98162804
		120				98163288
	MS 402	1.7	Standard	4 G 1.5	Yes	00795712
		2.5				00795739
		5				00798891
		10				00798892

MS 4000 model B three-phase motor cables

TML-B motor cables with EPR outer sheath (ethylene propylene rubber)						
Product	Motor type	Length [m]	Cross-section [mm ²]	Plug for drop cable	Product numbers	
					Plug steel grade standard	Plug steel grade R
 TM082016	MS 4000	10	4 G 1.5	Yes	00795620	00795861
		20			00795621	00795862
		30			00795622	00795863
		40			00795623	00795864
		50			00795624	00795865
		60			00795625	00799924
		70			00795626	00799923
 GR-1019516	MS 4000	10		No	00795632	00795873
		20			00795633	00795872
		30			00795634	00795871
		40			00795635	00795870
		50			00795636	00795869
		60			00795637	00799926
		70			00795638	00799925

MS 4000 model B environmental three-phase motor cables

PTFE motor cables with teflon outer sheath					
Product	Motor type	Length [m]	Cross-section [mm ²]	Plug for drop cable	Product numbers
					Plug steel grade R
 TM082018	MS 4000	10	4 G 2.5	No	00795667
		20			00795668
		30			00795669
		40			00795670
		50			00795671
		60			00795672
		70			00795673
		80			00795674
		90			00795675
		100			00795676
		110			96476404
		120			96426909
		200			96432567

MS 4000 model C three-phase motor cables

TML-B motor cables with EPR outer sheath (ethylene propylene rubber)					
Motor type	Length [m]	Cross- section [mm ²]	Plug for drop cable	Product numbers	
				Plug steel grade standard	Plug steel grade R
MS 4000	10	4 G 1.5	Yes	99410147	99411421
	20			99410168	99411434
	30			99410189	99411472
	40			99410194	99411488
	50			99410198	99411505
	60			99410214	99412700
	70			99410219	99412650
MS 4000	10	4 G 1.5	No	99410245	99412525
	20			99410252	99412497
	30			99410264	99412464
	40			99410266	99412383
	50			99410301	99411611
	60			99410303	99412782
	70			99410425	99412702

MS 4000 model C environmental three-phase motor cables

PTFE sheathed cable				
Motor type	Length [m]	Cross-section [mm ²]	Plug for drop cable	Product numbers
				Plug steel grade R
MS 4000	10	4 G 2.5	No	99410476
	20			99411153
	30			99411155
	40			99411156
	50			99411158
	60			99411160
	70			99411183
	80			99411188
	90			99411193
	100			99411196
	110			99413762
	120			99413722
	150			99414036
	200			99413755
	220			99413882
	400			99413760

MS 6000 three-phase motor cables

TML-B motor cables EPR outer sheath (ethylene propylene rubber)						
Product	Motor type	Length [m]	Cross-section [mm ²]	Plug for drop cable	Product numbers	
					Plug steel grade N	Plug steel grade R
 TM079609	MS 6000	10	4G 6.0	No	96164211	96300113
		20			96164212	96300115
		30			96164213	96300117
	MS 6000	10	4G 10.0		96164215	96300124
		20			96164216	96300126
		30			96164217	96300128
		40			99522680	96300129
		50			96164218	96300130

Note: For longer motor cables, contact Grundfos.

Submersible drop cable

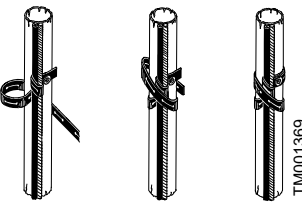
Product	Description	Number of leads and nominal cross-section [mm ²]	Outer cable diameter min./max. [mm]	Weight [kg/m]	Product number
 TM007882	Suitable for the following applications: - continuous application in groundwater and potable water (approved for potable-water applications) - connection of electrical equipment, such as submersible motors - installation depths up to 2000 metres and average loads. Ozone-, water- and weather-resistant insulation and sheath of special EPR-based elastomer materials adapted to applications in water. Maximum permissible water temperature: 60 °C. Maximum permissible lead service temperature: 90 °C. Further cable sizes are available. For more information, see Grundfos Product Center.	1 × 16	11.0 / 14.5	0.280	00ID4071
		1 × 25	12.5 / 16.5	0.365	00ID4072
		1 × 35	14.0 / 18.5	0.490	00ID4073
		1 × 50	16.5 / 21.0	0.690	00ID4074
		1 × 70	18.5 / 23.5	0.920	00ID4075
		1 × 95	21.0 / 26.5	1.210	00ID4076
		1 × 120	23.5 / 28.5	1.455	00ID4077
		1 × 150	26.0 / 31.5	1.825	00ID4078
		1 × 185	27.5 / 34.5	2.160	00ID4079
		4G1.5	10.5 / 13.5	0.165	00ID4063
		4G2.5	12.5 / 15.5	0.235	00ID4064
		4G4.0	14.5 / 18.0	0.335	00ID4065
		4G6.0	16.5 / 22.0	0.460	00ID4066
		4G10	22.5 / 24.5	0.800	00ID4067
		4G16	26.5 / 28.5	1.165	00ID4068
		4G25	32.0 / 34.0	1.650	00ID4069
		4G35	33.0 / 42.5	2.200	96432949
		4G50	38.0 / 48.5	3.260	96432950
		4G70	43.0 / 54.5	4.149	96432951

Submersible drop cables with plug

Submersible drop cable with plug to MS402 MS4000 with 2 plug motor cable.

Product	Cable length [m]	Product number
 TM078947	4 × 1.5 mm ²	
	15	96737342
	20	96737343
	25	96737344
	30	96737345
	40	96737347
	50	96737349
	70	96737351
	100	96737354
	4 × 2.5 mm ²	
	15	0079H021
	20	0079H022
	25	0079H023
	30	0079H024
	40	0079H025
	50	0079H026
	70	0079H028
	100	0079H029
	4 × 4 mm ²	
	15	0079H041
	20	0079H042
	25	0079H043
	30	0079H044
	40	0079H045
	50	0079H046
	70	0079H048
	100	0079H049

Cable clips

Product	Description	Product number
	For fastening of the cable and straining wire to the riser pipe. The clips must be fitted every 3 metres. One set for approximately 45 m riser pipe. • 16 cable buttons. • 7.5 m rubber band.	00115016

Female plug kit for drop cable

Product	Description	Version	Product number	
			N-version	R-version
	Female plug for watertight joining of MS402/MS4000 with 2 plug motor cable and submersible drop cable in an acrylic tube filled with resin. Used for both single- and multi-core cables during installation of submersible pumps. 24 hours of hardening is required.	For cables up to $4 \times 2.5 \text{ mm}^2$	00799901	00799918
		For cables up to $4 \times 6 \text{ mm}^2$	00799902	97937466

Cable termination kit, type KM

For instructions on how to make the cable termination between motor cable and drop cable, see [KM quick guide](#).

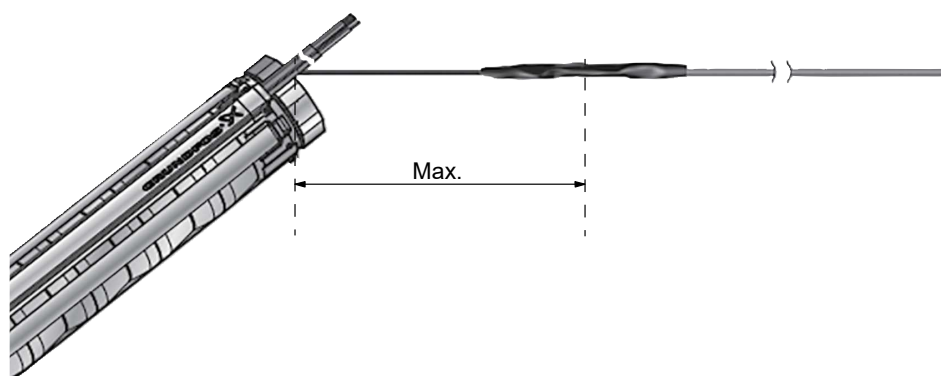
Drop cable to motor cable

When a submersible motor cable is extended with a larger drop cable, the termination always has to be as close to the pump outlet as possible, maximum 0.5 metre above the pump outlet.

When the pump is provided with a drop cable, the motor cable is connected right after the pump outlet.

Do not join two cables that have a larger cross section span than stated in the following table. When a larger span is needed, make 2 (or more) terminations with a 0.5 m drop cable.

Note: Submersible motor cables are designed for submerged operation. For an air operation, it has to be calculated.



TM069876

Motor cable [mm ²]	Drop cable, maximum increase per step			
	[mm ²]			
2.5	6.0	16.0	50.0	-
6.0	16.0	35.0	70.0	150.0
10.0	25.0	50.0	120.0	240.0
16.0	50.0	120.0	240.0	-
25.0	70.0	150.0	240.0	-
35.0	70.0	150.0	240.0	-
50.0	120.0	240.0	-	-
70.0	150.0	240.0	-	-

Possible cable terminations

Possible cable termination		Content of kit	Motor cable	Drop cable	Number of leads	Product number
Motor cable	Drop cable		[mm ²]	[mm ²]		
			KM kits with pressed connections:			
			1.5 - 6	1.5 - 6	4	00116251
			6-16	6-16	4	00116252
			10-25	10-25	4	00116255
			KM kits with screw connectors:			
			6-35	6-35	4	96636867
			25-70	25-70	4	96636868

Possible cable termination		Content of kit	Motor cable	Drop cable	Number of leads	Product number
Motor cable	Drop cable		[mm ²]	[mm ²]		
			KM kits with pressed connections:			
			1.5 - 6	1.5 - 6	4	00116257
			6-16	6-16	4	00116258
			10-50	10-50	4	96637330
			16-70	16-70	4	96637332
			1.5 - 6	1.5 - 6	3	00116253
			10-25	10-25	3	00116254
			10-50	10-50	3	96637318
			16-70	16-70	3	96637331

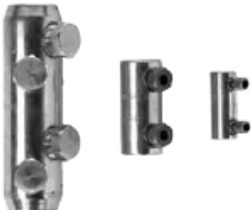
Possible cable termination		Content of kit	Motor cable	Drop cable	Number of leads	Product number
Motor cable	Drop cable		[mm ²]	[mm ²]		
			KM kits with pressed connections:			
			10-70	10-70	1	96828296
			35-120	35-120	1	00116256
			KM kits with screw connectors:			
			95-240	95-240	1	96637279

Note: A KM termination kit for single leads only consist of material for one connection. When ordering, keep in mind how many kits are needed for a complete cable termination.

Note: A KM termination kit for single leads only consist of material for one connection. When ordering, keep in mind how many kits are needed for a complete cable termination.

Cable termination kit, types M0 to M4

Product	Description	Version			
 TM044981	For watertight joining of motor cable and submersible drop cable. The joint is encapsulated by the glue which is part of the kit.	Type	Diameter of cable joint [mm]	Outer cable diameter [mm]	Product number
		M0	Ø40	Ø6 - Ø15	ID8903
		M1	Ø46	Ø9 - Ø23	ID8904
		M2	Ø52	Ø17 - Ø31	ID8905
		M3	Ø77	Ø26 - Ø44	ID8906
		M4	Ø97	Ø29 - Ø55	91070700

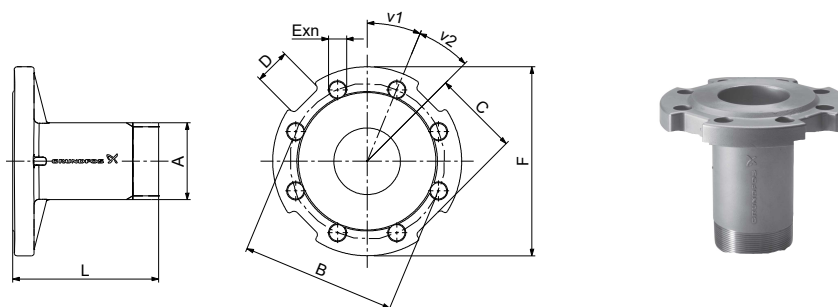
Product	Description	Version		
 TM078945	Accessories for cable kits M0 to M4. Screw connectors only.	Cross-section of leads [mm²]		Product number
		6-25		96626021
		16-95		96626022
		35-185		96626023
		70-240		96626024

4. Mechanical accessories

Connecting pieces / Adaptors

The tables below show the range of connecting pieces for connection of thread-to-flange and thread-to-thread.

Thread-to-flange (standard flange to EN 1092-1)

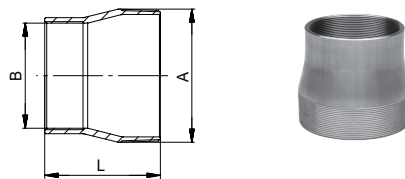


TM078417

Dimensional sketch and photo of the connecting piece thread-to-flange

Type	Pump outlet	Connecting piece	Thread-to-flange											Product number	
			A	Dimensions [mm]						v1	v2	n			
				B	C	D	E	F	L						
													EN 1.4308	EN 1.4517	
SP 17 SP 18	Rp 2 1/2	R 2 1/2 → DN 50 PN 16/40	R 2 1/2	125	65	40	Ø19	Ø165	170	30	30	4	00120125	00120911	
		R 2 1/2 → DN 65 PN 16/40	R 2 1/2	145	71	30	Ø19	Ø185	170	22.5	22.5	8	00120126	00120910	
		R 2 1/2 → DN 80 PN 16/40	R 2 1/2	160	82.5	40	Ø19	Ø200	170	22.5	22.5	8	00120127	00120909	
SP 30 SP 32	Rp 3	R 3 → DN 65 PN 16/40	R 3	145	71	30	Ø19	Ø185	170	22.5	22.5	8	00130187	00130920	
		R 3 → DN 80 PN 16/40	R 3	160	82.5	40	Ø19	Ø200	170	22.5	22.5	8	00130188	00130921	
		R 3 → DN 100 PN 16	R 3	180/190	100	40	Ø19	Ø220	170	22.5	22.5	8	00130210	00130867	
SP 46 SP 60		R 3 → DN 100 PN 40	R 3	180/190	100	40	Ø23	Ø235	170	22.5	22.5	8	00130189	00130922	
SP 46 SP 60		Rp 4	R 4 → DN 100 PN 16	R 4	180	100	40	Ø19	Ø235	180	22.5	22.5	8	00140077	00140737
		R 4 → DN 100 PN 40	R4	190	100	40	Ø23	Ø235	180	22.5	22.5	8	00140071	00140577	
SP 77 SP 95	Rp 5	R 5 → DN 100 PN 16	R 5	180	82	35	Ø19	Ø220	195	22.5	22.5	8	00160159	00160657	
		R 5 → DN 100 PN 40	R 5	190	82	35	Ø23	Ø235	195	22.5	22.5	8	00160148	00160646	
		R 5 → DN 125 PN 16	R 5	210	99	37	Ø19	Ø250	195	22.5	22.5	8	00160157	00160655	
		R 5 → DN 125 PN 40	R 5	220	99	37	Ø23	Ø270	195	22.5	22.5	8	00160149	00160647	
		R 5 → DN 150 PN 16	R 5	240	115	36	Ø23	Ø285	195	22.5	22.5	8	00160161	00160659	
		R 5 → DN 150 PN 40	R 5	250	115	36	Ø28	Ø300	195	22.5	22.5	8	00160150	00160648	
SP 125 SP 160 SP 215	Rp 6	R 6 → DN 125 PN 16	R 6	210	99	36	Ø19	Ø250	195	22.5	22.5	8	00170170	00170694	
		R 6 → DN 125 PN 40	R 6	220	99	36	Ø28	Ø270	195	22.5	22.5	8	00170159	00170596	
		R 6 → DN 150 PN 16	R 6	240	114	36	Ø23	Ø285	195	22.5	22.5	8	98518437	98518487	
		R 6 → DN 150 PN 40	R 6	250	114	36	Ø28	Ø300	195	22.5	22.5	8	00170160	00170597	
		R 6 → DN 200 PN 16	R 6	295	134	36	Ø23	Ø340	195	15	15	12	00170161	00170598	
		R 6 → DN 200 PN 40	R 6	320	151	36	Ø31	Ø375	200	15	15	12	00170162	00170599	

Thread-to-thread



TM078416

Dimensional sketch and photo of a connecting piece thread-to-thread

Type	Pump outlet	Connecting piece	Dimensions			Product number		
			Thread-to-thread		L [mm]	EN 1.4301	EN 1.4401	EN 1.4539
			A	B				
SP 77	Rp 5	R 5 → Rp 4	R 5	Rp 4	121	190063	190585	96917293
		R 5 → Rp 6	R 5	Rp 6	150	190069	190591	96917296
SP 95	5" NPT	5" NPT → 4" NPT	5" NPT	4" NPT	121	190064	190586	00190964
		5" NPT → 6" NPT	5" NPT	6" NPT	150	190070	190592	00190965
SP 125	Rp 6	R 6 → Rp 5	R 6	Rp 5	150	200130	200640	00200971
SP 160	6" NPT	6" NPT → 5" NPT	6" NPT	5" NPT	150	200135	200645	00200970
SP 215								

5. Flow sleeves

Grundfos offers a complete range of stainless-steel flow sleeves for both vertical and horizontal operation. Flow sleeves are recommended for all applications in which motor cooling is insufficient. The result is a general extension of motor life. Flow sleeves are to be fitted in the following cases:

- If the submersible pump is exposed to high thermal load, such as current unbalance, dry running, overload, high ambient temperature and bad cooling conditions.
- If aggressive liquids are pumped, since corrosion is doubled for every 10 °C the temperature rises.
- If sedimentation or deposits occur around and/or on the motor.
- If there is a top feeding in the well to ensure the flow velocity past the motor.

Maximum liquid temperature

The maximum permissible liquid temperature depends on the flow velocity of the liquid past the motor. See the table below.

Grundfos motor	Flow velocity past motor [m/s]	Maximum liquid temperature [°C]
MS 4"	0.15	40
MS 4" T60	0.15	60
MS6000	0.15	40
MS6000 T60	1.00	60
MS6000P	0.15	60
MMS6" with PVC windings	0.15	25
	0.50	30
MMS6" with PE/PA windings	0.15	45
	0.50	50
MMS 8", 10", 12" rewindable with PVC windings	0.15	25
	0.50	30
MMS 8", 10", 12" rewindable with PE/PA windings	0.15	40
	0.50	45

Note: For MMS 6", 37 kW, MMS 8", 110 kW, and MMS 10", 170 kW, the maximum liquid temperature is 5 °C lower than the values stated in the table above. For MMS 10", 190 kW, the temperature is 10 °C lower.

Note: More information about flow sleeves is available in [Grundfos Product Center](#).

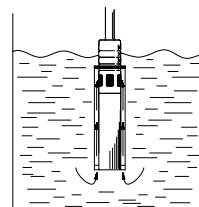


TM078415

Flow sleeves

Example of calculated flow sleeve

The flow sleeve is fitted to the submersible motor so that the liquid passes close by the motor on its way towards the pump suction interconnector. This ensures the optimum cooling of the motor. See fig. [Flow sleeve function](#).



TM010509

Flow sleeve function

Use this formula to calculate flow velocity:

$V = \frac{Q \times 353}{D^2 - d^2} \quad [\text{m/s}]$		
Q	m ³ /h	Flow rate
D	mm	Sleeve diameter
d	mm	Motor diameter

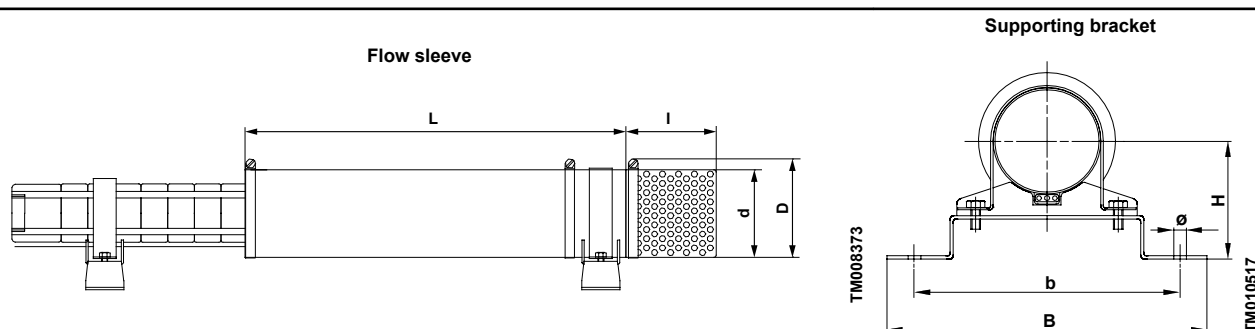
Submersible motor diameter

Motor type	Diameter (d) [mm]
MS402	95
MS4000	95
MS6000	139.5
MS6000P	139.5
MMS6	144
MMS8000	192
MMS10000	237
MMS12000	286

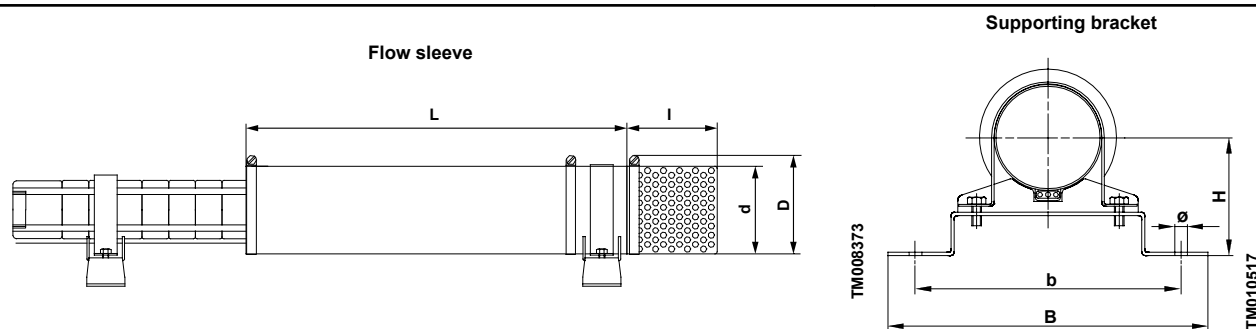
Oversized motor

Flow sleeves for pumps with oversized motor and for pumps with non-standard motor are available on request.

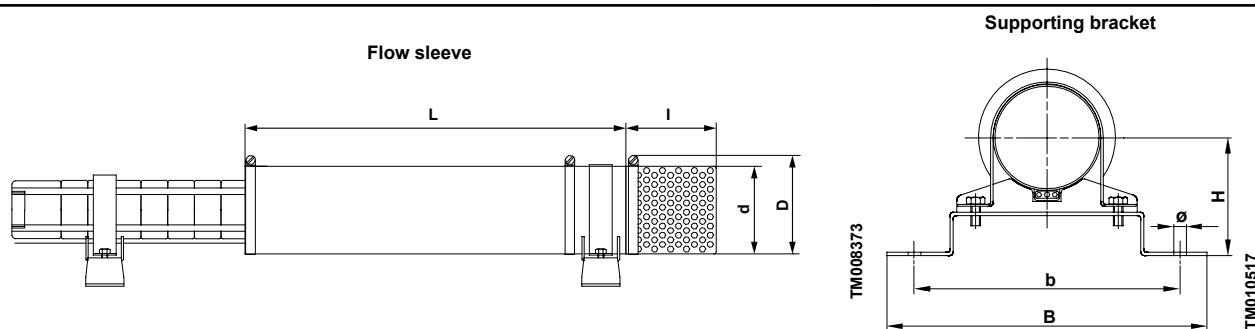
6. SP flow sleeve, standard version EN 1.4301 / AISI 304



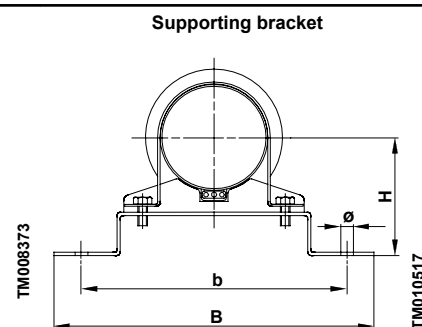
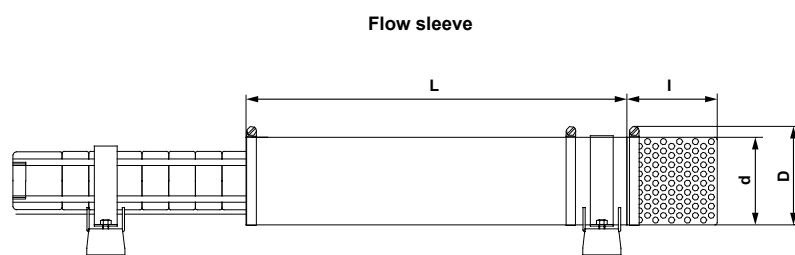
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP1A-9 to 28 SP2A-6 to 18 SP3A-6 to 12 SP5A-4 to 8	SP1A-9 to 22 SP2A-6 to 15 SP3A-5 to 10 SP5A-3 to 7	- d115 (130) × L400 - Motor 4", up to 0.75 kW 1.5 kg	96937110		
SP1A-36 to 57 SP2A-23 to 33 SP3A-15 to 25 SP5A-12 to 17 SP7-1 to 12 SP9-1 to 11 SP11-1 to 11 SP14-1 to 6	SP1A-26 to 39 SP2A-21 to 27 SP3A-14 to 18 SP5A-9 to 11 SP7-1 to 8 SP9-4 to 7 SP11-3 to 7 SP14-1 to 4	- d115 (130) × 500 - Motor 4", up to 2.2 kW 7 kg	96937111	97942211 d115 × 117 0.4 kg	96957450 (1 set = 2 brackets) 1.1 kg H100, b185, B220, Ø11
SP2A-40 to 65 SP3A-29 to 60 SP5A-21 to 60 SP7-13 to 42 SP9-13 to 29 SP11-11 to 27 SP14-7 to 23	SP2A-34 to 48 SP3A-24 to 38 SP5A-15 to 39 SP7-8 to 28 SP9-4 to 18 SP11-3 to 18 SP14-5 to 15	- d115 (130) × 800 - Motor 4", up to 5.5 kW 2.5 kg	96937179		
SP7-42 to 59 SP9-30 to 40 SP11-28 to 37 SP14-24 to 31	SP7-29 to 38 SP9-19 to 25 SP11-19 to 24 SP14-16 to 20	- d115 (130) × 1000 - Motor 4", 7.5 kW (MS 4000) 3.1 kg	96937204		96958279 (1 set = 2 brackets) 1.4 kg H100, b235, B275, Ø11
SP5A-52 to 60 SP7-32 to 59 SP9-23 to 40 SP11-21 to 37 SP14-18 to 31	SP5A-39 SP7-21 to 38 SP9-17 to 25 SP11-14 to 24 SP14-12 to 20	- d160 (180) × 800 - Motor 6", up to 7.5 kW (MS 6000) 4.0 kg	96937231		98557132 (1 set = 2 brackets) 1.4 kg H125, b185, B220, Ø11
SP9-41 to 55	SP9-26 to 38	- d160 (180) × 1000 - Motor 6" up to 11 kW (MS 6000) 4.0 kg	98779730	97942230 d160 × 158 0.8 kg	
SP2A-75 to 90	SP2A-58 SP3A-56	- d160 (180) × 1000 - Motor 4", 7.5 kW (MS 4000) 4.3 kg	96937205		96957525 (1 set = 3brackets) 1.4 kg H125, b185, B220, Ø11
SP5A-75 to 85 SP7-60 to 100 SP9-56 to 93	SP3A-56 to -75 SP5A-52 SP7-41 to 67 SP9-39 to 63	- d160 (180) × 1000 - Motor 6", up to 18.5 kW (MS 6000) 4.9 kg	93120816		



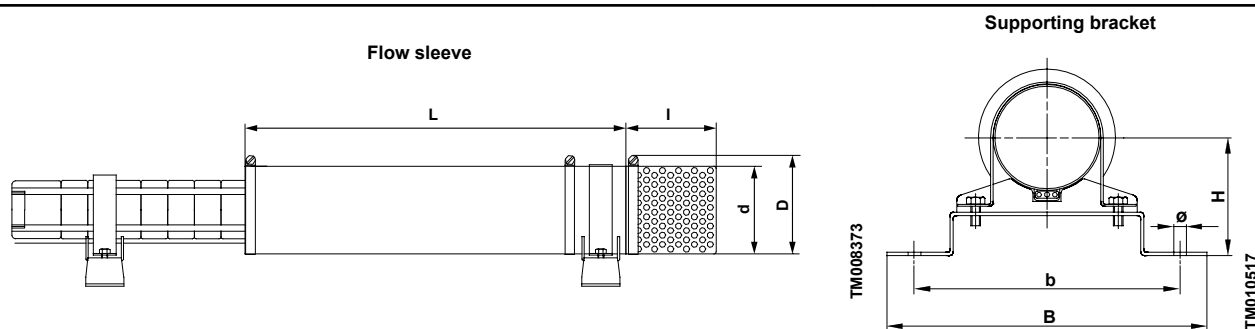
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP17/18-1	-	- d145 (160) × 450 - Motor 4", up to 2.2 kW (MS 4000) 1.9 kg	96937139		
SP17/18-2	SP17/18-1 to 2	- d145 (160) × 550 - Motor 4", up to 2.2 kW (MS 4000) 2.2 kg	96937140	97942214	96957523 (1 set = 2 brackets) 2.0 kg
SP30/32-1 to 2	SP30/32-1			d145 × 158 0.6 kg	H115, b185, B220, Ø11 for pumps up to 50 kg / 4" up to 7.5 kW
SP17/18-4 to 7	SP17/18-3 to 6	- d145 (160) × 800 - Motor 4", up to 4 kW (MS 4000) 3.1 kg	96937180		
SP30/32-3 to 4	SP30/32-2 to 3				
SP17/18-8 to 13	SP17/18-7 to 9	- d145 (160) × 1000 - Motor 4", 5.5 - 7.5 kW (MS 4000) 3.8 kg	96937182		
SP30/32-5 to 8	SP30/32-4 to 5				
SP17/18-8 to 24	SP17/18-5 to 15	- d180 (200) × 800 - Motor 6", up to 13 kW (MS 6000) 4.0 kg	96937242		96957529 (1 set = 2 brackets) 2.1 kg
SP30/32-5 to 15	SP30/32-3 to 10				H140, b300, B350, Ø11
SP17/18-25 to 40	SP17/18-16 to 26	- d180 (200) × 1000 - Motor 6", up to 22 kW (MS 6000) 4.9 kg	96937245	97942218	
SP30/32-16 to 26	SP30/32-11 to 17			d180 × 192 0.9 kg	
SP30/32-27 to 35	SP17/18-27 to 30	- d180 (200) × 1250 - Motor 6", 26 to 30 kW (MS 6000) 6.0 kg	96937249		
	SP30/32-18 to 23				
-	SP30/32-24 to 28	- d180 (200) × 1700 - Motor 6", up to 26-37 kW (MMS6) 8.5 kg	96937313		96957531 (1 set = 3 brackets) 3.1 kg H140, b300, B350, Ø11
SP17/18-43 to 53	SP17/18-33 to 36	- d200 (220) × 1250 - Motor 6", 26-30 kW (MS 6000) - Pump in sleeve d154 6.6 kg	96937246		96957544 (1 set = 2 brackets) 2.3 kg H150, b320, B370, Ø11
SP17/18-43 to 60	SP17/18-39 to 42	- d200 (220) × 1700 - Motor 6", 26-37 kW (MMS6) - Pump in sleeve d154 9.3 kg	96937315	97942247 d200 × 192 1.0 kg	97695369 (1 set = 3 brackets) 3.2 kg H150, b320, B370, Ø11
SP30/32-39 to 43					
SP17/18-55 to 60	SP17/18-45 to 50	- d200 (220) × 1700 - Motor 6", 37-45 kW (Franklin 6") - Pump in sleeve d154 9.3 kg	96937447		
SP30/32-39 to 49					
SP17/18-45	SP17/18-42 to 50	- d254 (270) × 1500 - Motor 8", 37-55 kW (MMS 8000 / Franklin 8") - Pump in sleeve d154 9.8 kg	96937462	97942263 d256 × 325 1.9 kg	96957561 (1 set = 3 brackets) 6.3 kg H200, b380, B430, Ø11
SP17/18-48	SP30/32-29 to 39				
SP30/32-46 to 54					



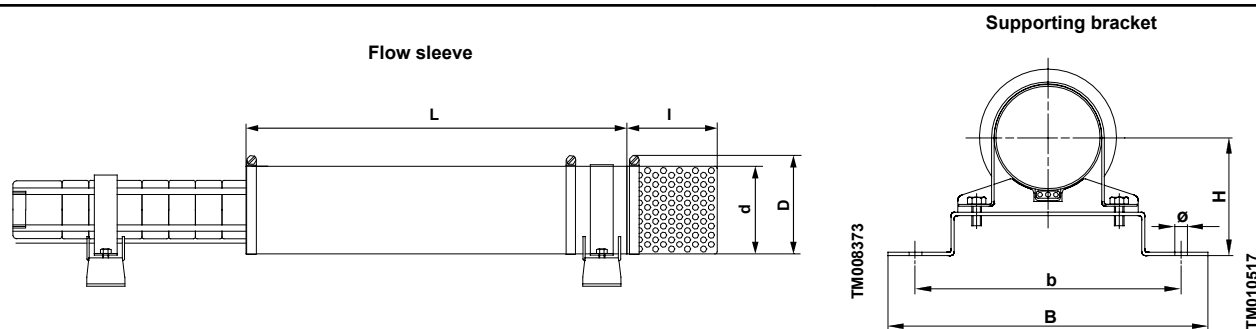
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP46-1-B SP46-1 SP46-2-BB SP60-1-A SP60-1	SP46-1-B SP46-1-B SP46-1-A SP60-1-B	- d180 (200) × 550 - Motor 4", up to 2.2 kW (MS 402/MS 4000) 2.9 kg	96937178		
SP46-2 SP46-3-C SP60-2-B SP60-2	SP46-1 SP46-2-AB SP60-1-A SP60-1 SP60-2-BB	- d180 (200) × 800 - Motor 4" 3.0 - 4.0 kW (MS 4000) 4.0 kg	96937187	97942218 d180 × 192 0.9 kg	96957524 (1 set = 2 brackets) 1.2 kg H140, b225, B260, Ø11 for pumps up to 50 kg / 4" up to 7.5 kW
SP46-3 SP46-4-C SP46-4 SP46-5 SP60-3 SP60-4	SP46-2 SP46-3-BB SP46-3 SP46-4-BC SP60-2 SP60-3-A	- d180 (200) × 1000 - Motor 4", 5.5 - 7.5 kW (MS 4000) 4.9 kg	96937190		
SP46-3 SP46-4-C SP46-4 to 10 SP60-3 to 9B	SP46-2 SP46-3BB SP46-3 SP46-4-BC SP46-4 to 7C SP60-2 SP60-3-A SP60-3 to 6B	- d200 (220) × 800 - Motor 6", up to 15 kW (MS 6000) 5.4 kg	96937322		96957545 (1 set = 2 brackets) 2.2 kg H150, b320, B370, Ø11
SP46-8 to 15 SP60-7 to 12	-	- d200 (220) × 1000 - Motor 6", up to 22 kW (MS 6000) 6.4 kg	96937323	97942247 d200 × 192 1.0 kg	
SP46-13 to 20 SP60-11 to 17	SP46-7 to 13 SP60-6 to 11	- d200 (220) × 1250 - Motor 6", 18.5 - 30 kW (MS 6000) 6.6 kg	96937317		
SP46-16 to 24 SP60-13 to 21	SP46-14 to 17 SP60-12 to 14	- d200 (220) × 1700 - Motor 6", 26-37 kW (MMS6) 9.3 kg	96937318		96957549 (1 set = 3 brackets) 3.4 kg H150, b320, B370, Ø11
SP46-21 to 24 SP60-18 to 22	SP60-12 to 17	- d200 (220) × 1700 - Motor 6", 26-37 kW (Franklin 6") 9.3 kg	96937448		



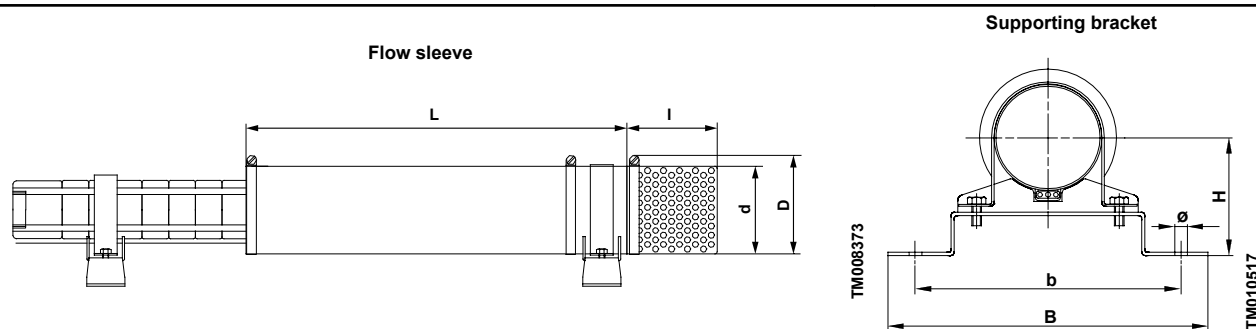
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP46-21 to 24 SP60-18 to 22	SP46-14 to 17 SP60-12 to 14	- d254 (270) × 1500 - Motor 8", 37-45 kW (MMS 8000) 9.8 kg	96937463		96957592 (1 set = 3 brackets) 6.0 kg H200, b380, B430, Ø11
SP60-22	SP46-18 to 19 SP60-15 to 18	- d254 (270) × 1250 - Motor 8", 55 kW (Franklin 8") 8.8 kg	96937465	97942263 d256 × 325 1.9 kg	98095530 (1 set = 2 brackets) 6.0 kg H200, b380, B430, Ø11
SP46-26 to 35 SP60-24 to 30	SP46-20 to 24 SP60-19 to 20	- d254 (270) × 1500 - Motor 8", 45-55 kW (MMS 8000 / Franklin 8") - Pump in sleeve d154 9.8 kg	96937472		96957561 (1 set = 3 brackets) 6.3 kg H200, b380, B430, Ø11
SP46-37	SP60-21	- d254 (270) × 1700 - Motor 8", 63-75 kW (MMS 8000 / Franklin 8") - Pump in sleeve d154 9.8 kg	96937474		
SP77-1 to 4 SP95-1 to 4B	SP77-1 SP77-2BA SP77-2-A SP77-2 SP77-3-AA SP77-3-A SP95-1-A SP95-1 SP95-2-AB SP95-2-B SP95-2 SP95-3-BB	- d210 (225) × 1000 - Motor 6", up to 18.5 kW (MS 6000) 5.6 kg	96937332		96957546 (1 set = 2 brackets) 2.5 kg H160, b330, B380, Ø11
SP77-5 to 9 SP95-4 SP95-5-AB SP95-5 to 7	SP77-3 to 6-B SP95-3-B SP95-3 SP95-4-AB SP95-4 SP95-5-B	- d210 (225) × 1250 - Motor 6", up to 30 kW (MS 6000) 6.9 kg	96937440	97942261 d210 × 192 1.1 kg	
SP77-7 to 11 SP95-8 to 9	SP77-6 SP77-7 SP95-5 SP95-6	- d210 (225) × 1700 - Motor 6", 26-37 kW (MMS6) 10.6 kg	96937319		96957553 (1 set = 3 brackets) 6.0 kg H160, b330, B370, Ø11
SP77-10 to 12 SP95-8 to 10	SP77-6 to 8 SP95-5 to 7	- d210 (225) × 1700 - Motor 6", 37-45 kW (Franklin 6") 9 kg	96937449		



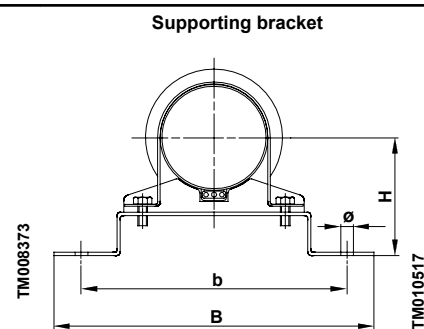
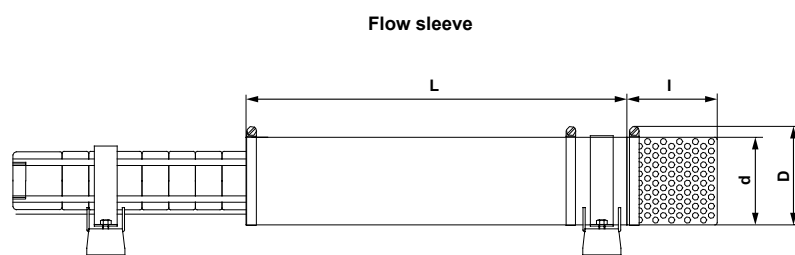
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP77-10 to 15 SP95-8 to 13	SP77-6 to 10 SP95-5 to 8	- d254 (270) × 1500 - Motor 8", 37-55 kW (MMS 8000 / Franklin 8") 12.4 kg	96937475		
SP77-16 to 21 SP95-14 to 17	SP77-11 to 13 SP95-9 to 11	- d254 (270) × 1700 - Motor 8", 63-75 kW (MMS 8000 / Franklin 8") 11 kg	96937476	97942263 d256 × 325 1.9 kg	96957593 (1 set = 3 brackets) 5.8 kg H200, b380, B430, Ø11
SP77-22 SP95-18 to 20	SP77-14 SP77-15 SP95-12 SP95-13	- d254 (270) × 2000 - Motor 8", up to 92 kW (MMS 8000 / Franklin 8") 13.4 kg	96937477		
SP77-19 to 20 SP95-15 to 17	SP95-11	- d285 (300) × 1500 - Motor 10", up to 75 kW (MMS 10000) 11.4 kg	96937507	97942269 d285 × 385 2.7 kg	97695337 (1 set = 3 brackets) 10.1 kg H225, b410, B460, Ø11
SP77-22 SP95-18 to 20	SP95-12 SP95-13	- d285 (300) × 2000 - Motor 10", 92 kW (MMS 10000) 15.1 kg	96937508		
SP125-1-A SP125-1 SP125-2-AA SP160-1-A SP160-1	SP125-1-A SP125-1 SP160-1-A	- d254 (270) × 1000 - Motor 6", up to 18.5 kW (MS 6000) 6.7 kg	96937441		96957548 (1 set = 2 brackets) 3.4 kg H200, b380, B430, Ø11
SP125-2-A SP125-2 SP125-3/A/AA SP160-2/A/AA SP160-3-AA	SP125-2-AA SP125-2-A SP125-2 SP160-1 SP160-2-AA	- d254 (270) × 1250 - Motor 6", up to 30 kW (MS 6000) 8.3 kg	96937443	97942263 d256 × 325 1.9 kg	
SP125-3/3A SP125-4/A/AA SP160-2 SP160-3/A/AA	SP125-3-AA SP125-3-A SP160-2-A SP160-2 SP160-3-AA	- d254 (270) × 1700 - Motor 6", 26-37 kW (MMS6) 11.4 kg	96937320		96957560 (1 set = 3 brackets) 5.2 kg H200, b380, B430, Ø11
SP125-4/A/AA SP125-5-A/AA SP160-3-A SP160-4-A/AA	SP125-3-AA SP125-3-A SP125-3 SP160-2-A to 2 SP160-3-AA	- d254 (270) × 1700 - Motor 6", 37-45 kW (Franklin 6") 11.4 kg	96937450		



Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP125-4/A/AA	SP125-3-AA				
SP125-5/A/AA	SP125-3-A				
SP125-6-AA/6-A	SP125-4-AA	• d285 (300) × 1500	96937478		
SP160-3/3-A	SP125-4-A	• Motor 8", 37-55 kW (MMS 8000 / Franklin 8")			
SP160-4/A/AA	SP160-3-AA	• 11.4 kg			
SP160-5-AA/5-A	SP160-3-A				
	SP160-3				
SP125-6	SP125-4				96957595
SP125-7/A/AA	SP125-5-AA	• d285 (300) × 1700	96937479	97942269	(1 set = 3 brackets)
SP125-8/A/AA	SP125-5-A	• Motor 8", 63-75 kW (MMS 8000 / Franklin 8")		d285 × 385	10.1 kg
SP160-5	SP125-6-AA	• 12.8 kg		2.7 kg	H225, b410, B460, Ø11
SP160-6/A/AA	SP160-4-AA				
SP160-7-AA	SP160-4-A				
	SP160-4				
SP125-9/A/AA	SP125-6-A/-6				
SP125-10/A/AA	SP125-7-AA	• d285 (300) × 2250	96937487		
SP125-11	SP125-7-A	• Motor 8", up to 92-110 kW (MMS 8000 / Franklin 8")			
SP160-7/A	SP125-7	• 16.8 kg			
SP160-8/A/AA	SP160-5-AA				
SP160-9/A/AA	SP160-5-A				
SP160-10-AA	SP160-5 to 6				
SP125-7/A/AA					
SP125-8/A/AA		• d330 (350) × 1700	96937510	97942268	96957597
SP125-9/A/AA		• Motor 10", 75-92 kW (MMS 10000)		d330 × 385	(1 set = 3 brackets)
SP125-10/A/AA	-	• 14.4 kg		1.9 kg	10.5 kg
SP160-6/6-A					H225, b410, B460, Ø11
SP160-7/A/AA					
SP160-8/A/AA					
-	SP125-8 to 10 SP160-7 to 8	• d285 (300) × 2600 • Motor 8", up to 150 kW (Franklin 8") • 19.1 kg	96937503	97942269 d285 × 385 2.7 kg	96957595 (1 set = 3 brackets) 10.1 kg H225, b410, B460, Ø11
SP125-12 to 13 SP160-8 to 9/A/AA SP160-10/A SP160-11	96507609 (2502.0261.260)	• d330 (350) × 2000 • Motor 10", up to 132 kW (MMS 10000) • 17.2 kg	96937522	97942268 d330 × 385 1.9 kg	96957597 (1 set = 3 brackets) 10.5 kg H225, b450, B460, Ø11
SP125-14 to 17 SP160-12 to 14	SP125-10 to 11 SP160-8 to 9	• d330 (350) × 2500 • Motor 10", up to 147-170 kW (MMS 10000) • 21.2 kg	96937524		
-	SP125-11 to 13 SP160-9 to 10	• d380 (400) × 2000 • Motor 12", up to 190 kW (MMS 12000) • 19.6 kg	96937555	97942272 d380 × 385 4.1 kg	96957599 (1 set = 3 brackets) 12.1 kg H270, b550, B600, Ø11
SP160-15	-	• d380 (400) × 2250 • Motor 12", 190 kW (MMS 12000) • 21.9 kg	96937529		

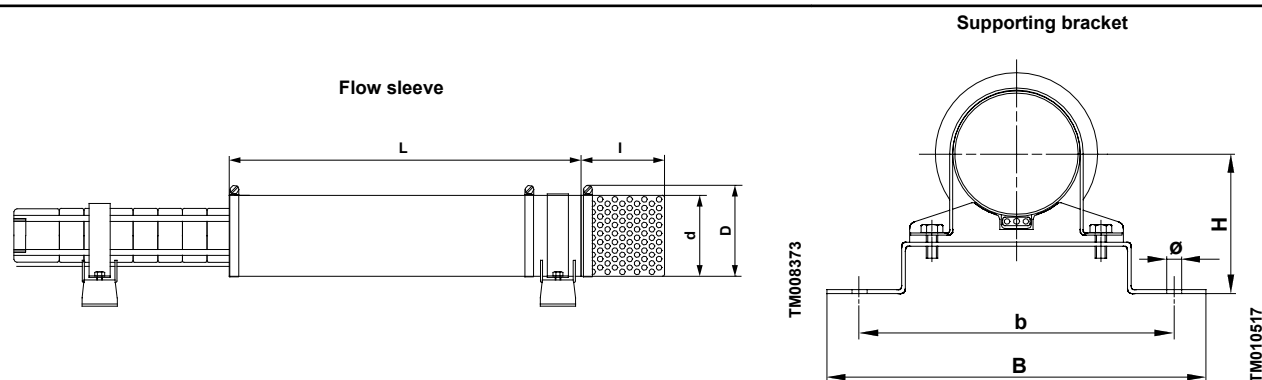


Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP215-1-A SP215-1 SP215-2-AA	SP215-1-A SP215-1	- d330 (350) × 1250 - Motor 6", up to 30 kW (MS 6000) 10.6 kg	96937446		96958364 (1 set = 2 brackets) 10.0 kg H250, b500, B550, Ø11
SP215-2-AA SP215-2A	SP215-1	- d330 (350) × 1800 - Motor 6", 30-37 kW (MMS6) 16.5 kg	96937321		
SP215-2-A SP215-2	SP215-2-AA	- d330 (350) × 1800 - Motor 6", 37-45 kW (Franklin 6") 16.5 kg	96937451		
SP215-2-A SP215-2 SP215-3-AA SP215-3-A SP215-3 SP215-4-AA SP215-4-A SP215-4	SP215-2 SP215-2A SP215-2AA SP215-3-AA	- d330 (350) × 1800 - Motor 8", up to 75 kW (MMS 8000 / Franklin 8") 14.6 kg	96937480		
SP215-5-AA SP215-5-A SP215-5 SP215-6-AA SP215-6-A	SP215-3-A SP215-3 SP215-4-AA SP215-4-A SP215-4	- d330 (350) × 2250 - Motor 8", up to 110 kW (MMS 8000 / Franklin 8") 19.1 kg	96937488		
SP215-7-AA SP215-7-A SP215-7	SP215-5-AA SP215-5-A	- d330 (350) × 2500 - Motor 8", 130 kW (Franklin 8") 21.1 kg	96937490	97942268 d330 × 385 1.9 kg	96957555 (1 set = 3 brackets) 10.7 kg H250, b500, B550, Ø11
SP215-8-AA SP215-8-A SP215-8	SP215-5	- d330 (350) × 2700 - Motor 8", 150 kW (Franklin 8") 22.8 kg	96937491		
SP215-4-AA SP215-4-A SP215-4 SP215-5-AA SP215-5-A SP215-5	-	- d330 (350) × 1800 - Motor 10", up to 92 kW (MMS 10000) 16.5 kg	96937526		
SP215-6-AA SP215-6-A SP215-6 SP215-7-AA SP215-7-A SP215-7	SP215-5-AA SP215-5-A	- d330 (350) × 2250 - Motor 10", up to 132 kW (MMS 10000) 19.1 kg	96937527		
SP215-8-AA SP215-8-A SP215-8 SP215-9-AA SP215-9-A SP215-9	SP215-5 SP215-6-AA SP215-6-A SP215-6	- d330 (350) × 2500 - Motor 10", up to 170 kW (MMS 10000) 21.2 kg	96937528		

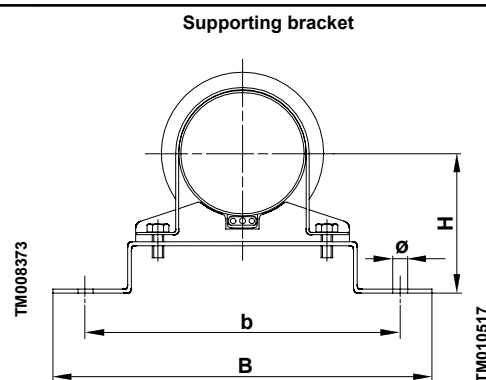
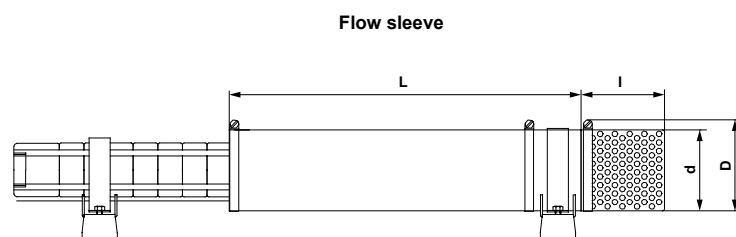


Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number Dimensions d × l Weight	Product number Description
SP215-7-AA					
SP215-7-A					
SP215-7					
SP215-8-AA	SP215-6-AA				
SP215-8-A	SP215-6-A	• d380 (400) × 2250			
SP215-8	SP215-6	• Motor 12", up to 190 kW (MMS 12000)	96937531	97942272	96957600
SP215-9-AA	SP215-7-AA	• 21.9 kg		d380 × 385	(1 set = 3 brackets)
SP215-9-A	SP215-7-A			4.0 kg	12 kg
SP215-9	SP215-7				H270, b550, B600, Ø11
SP215-10-AA					
SP215-10-A					
SP215-10					
SP215-11	-	• d380 (400) × 2500 • Motor 12", 220 kW (MMS 12000) • 24.2 kg	96937553		

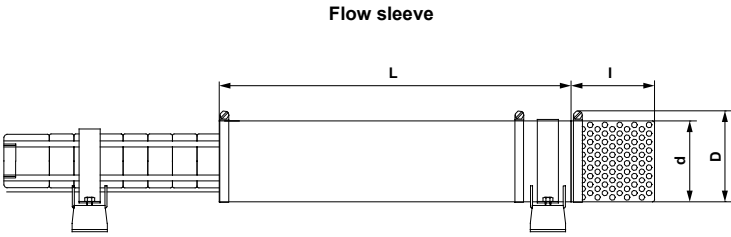
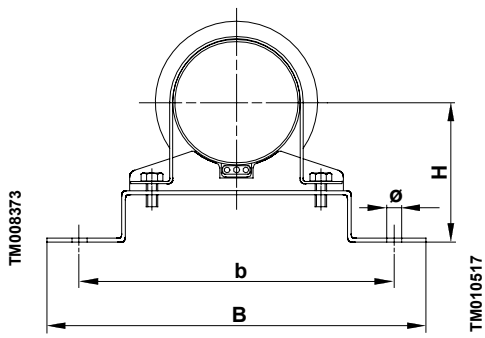
7. SP flow sleeve, R-version, EN 1.4539 / AISI 904L

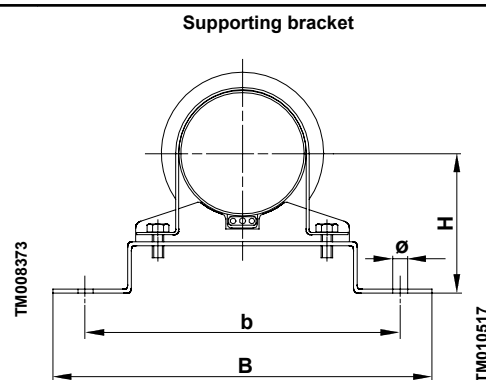
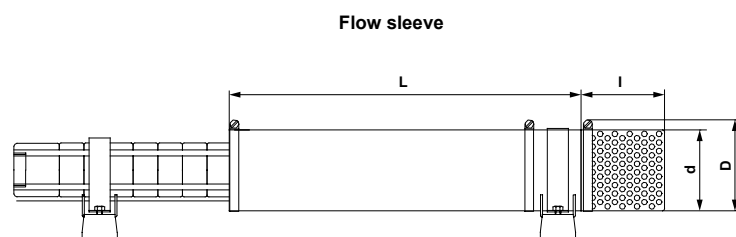


Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP3A-6 to 33 SP5A-4 to 35 SP7-1 to 12 SP9-1 to 11 SP11-1 to 11 SP14-1 to 6	SP3A-5 to 24 SP5A-3 to 25 SP7-1 to 8 SP9-4 to 7 SP11-3 to 7 SP14-1 to 4	- d115 (130) × 550 - Motor 4", up to 2.2 kW (MS 4000) 1.7 kg	96937598		96958367 (1 set = 2 brackets) 0.7 kg
SP3A-34 to 60 SP5A-33 to 60 SP7-13 to 42 SP9-8 to 32 SP11-11 to 27 SP14-7 to 23	SP3A-32 to 56 SP5A-21 to 39 SP7-8 to 28 SP9-7 to 19 SP11-3 to 18 SP14-5 to 15	- d115 (130) × 800 - Motor 4", up to 5.5 kW (MS 4000) 2.5 kg	96937633	97941779 d115 × 117 0.4 kg	H100, b185, B220, Ø11 for pumps up to 50 kg / 4" up to 5.5 kW
SP7-42 to 59 SP9-32 to 40 SP11-28 to 37 SP14-24 to 31	SP7-29 to 38 SP9-19 to 25 SP11-19 to 24 SP14-16 to 20	- d115 (130) × 1000 - Motor 4", 7.5 kW (MS 4000) 3.1 kg	96898643		96958371 (1 set = 2 brackets) 0.9 kg H100, b235, B275, Ø11
SP5A-52 to 60 SP7-32 to 59 SP9-23 to 40 SP11-21 to 37 SP14-18 to 31	SP5A-39 SP7-21 to 38 SP9-17 to 25 SP11-19 to 24 SP14-12 to 20	- d160 (180) × 800 - Motor 6", up to 7.5 kW (MS 6000) 4.9 kg	96937224		98557134 (1 set = 2 brackets) 1.4 kg
SP9-41 to 55	SP9-26 to 38	- d160 (180) × 1000 - Motor 6", up to 11 kW (MS 6000) 4.0 kg	98779731	97941790 d160 × 158 0.8 kg	H115, b185, B220, Ø11
SP2A-75 to 90	SP2A-58 SP3A-56	- d160 (180) × 1000 - Motor 4", up to 7.5 kW (MS 4000) - Pump in sleeve d108 4.3 kg	96898645		96958373 (1 set = 2 brackets) 1.4 kg H125, b185, B220, Ø11
SP5A-75 to 85 SP7-60 to 100 SP9 -56 to 93	SP3A-56 to 75 SP5A-52 SP7-41 to 67 SP9-39 to 63	- d180 (200) × 1000 - Motor 6", up to 18.5 kW (MS 6000) - Pump in sleeve d108 4.9 kg	96937690	97941786 d180 × 192 0.8 kg	96958375 (1 set = 2 brackets) 2.0 kg H140, b300, B350, Ø11

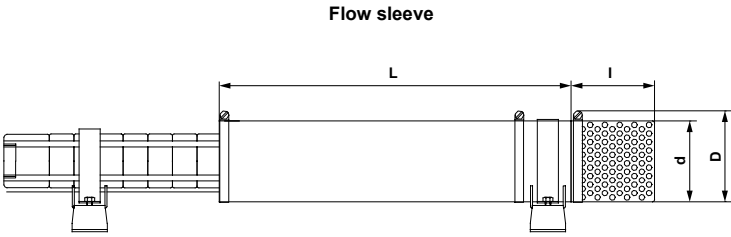
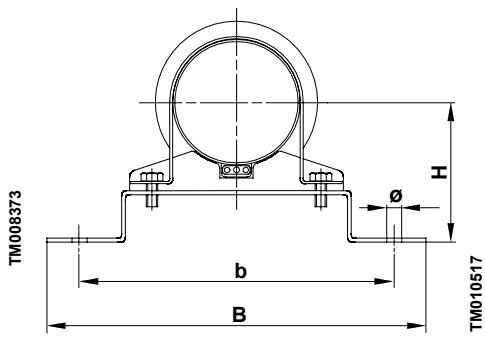


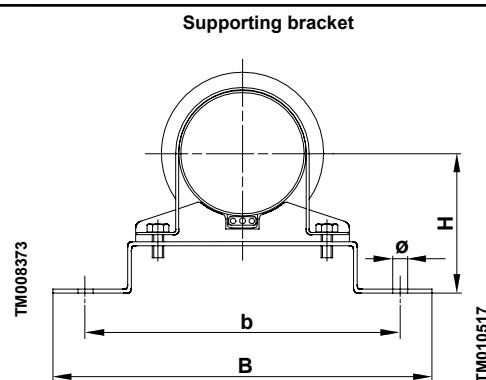
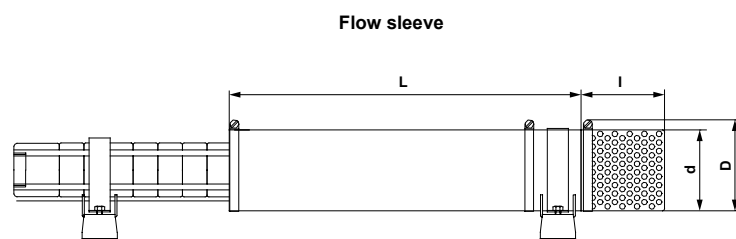
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP17/18-1 to 4 SP30/32-1 to 2	-	- d145 (160) × 625 - Motor 4", up to 2.2 kW (MS 4000) 3.7 kg	96898600		
SP17/18-2 SP17/18-3 (3~) SP30/32-1 to 2	SP17/18-1 to 2 SP30/32-1	- d145 (160) × 550 - Motor 4", up to 2.2 kW (MS 4000) 2.2 kg	96898601	97941782 d145 × 158 0.6 kg	96958368 (1 set = 2 brackets) 0.8 kg for pumps up to 50 kg / 4" up to 7.5 kW H115, b185, B220, Ø11
SP17/18-3 (1~) SP17/18-4 to 7 SP30/32-3 to 4	SP17/18-3 to 6 SP30/32-2 to 3	- d145 (160) × 800 - Motor 4", up to 4 kW (MS 4000) 3.1 kg	96898638		
SP17/18-8 to 13 SP30/32-5 to 8	SP17/18-7 to 9 SP30/32-4 to 5	- d145 (160) × 1000 - Motor 4", 5.5 - 7.5 kW (MS 4000) 3.8 kg	96898640		
SP17/18-8 to 24 SP30/32-5 to 15	SP17/18-5 to 15 SP30/32-4 to 10	- d180 (200) × 800 - Motor 6", 6 to 13 kW (MS 6000) 5.6 kg	96937689	97941786 d180 × 192 0.9 kg	96958375 (1 set = 2 brackets) 2.0 kg H140, b300, B350, Ø11
SP17/18-25 to 40 SP30/32-16 to 26	SP17/18-16 to 26 SP30/32-11 to 17	- d180 (200) × 1000 - Motor 6", up to 22 kW (MS 6000) 5.4 kg	96937691		
SP30/32-27 to 35	SP17/18-27 to 30 SP30/32-18 to 23	- d180 (200) × 1250 - Motor 6", 26 to 30 kW (MS 6000) 4.9 kg	96937723		
SP30/32-27 to 35	SP30/32-24 to 28	- d180 (200) × 1700 - Motor 6", up to 26-30 kW (MMS6) 8.5 kg	96898633		96958376 (1 set = 3 brackets) 2.3 kg H140, b310, B350, Ø11
SP17/18-43 to 53	SP17/18-33 to 36	- d200 (220) × 1250 - Motor 6", 26-30 kW (MS 6000) - Pump in sleeve d154 6.0 kg	96937722	97941767 d200 × 192 1.0 kg	96960265 (1 set = 2 brackets) 2.3 kg H150, b320, B370, Ø11
SP17/18-43 to 60 SP30/32-39 to 43	SP17/18-39 to 42	- d200 (220) × 1700 - Motor 6", 26-37 kW (MMS6) - Pump in sleeve d154 9.3 kg	96898634		97757234 (1 set = 3 brackets) 3.3 kg H150, b340, B370, Ø11
SP17/18-55 to 60 SP30/32-39 to 49	SP17/18-45 to 50	- d200 (220) × 1700 - Motor 6", 37-45 kW (Franklin 6") - Pump in sleeve d154 10.8 kg	96898650		

				Supporting bracket	
					
Pump type		Flow sleeve	Strainer	Supporting brackets	
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description	
SP30/32-46 to 54	SP17/18-42 to 50 SP30/32-29 to 39	- d254 (270) × 1500 - Motor 8", 45-55 kW (MMS 8000 / Franklin 8") - Pump in sleeve d154 9.8 kg	96900228	97941815 d256 × 325 1.9 kg	96958411 (1 set = 3 brackets) 4.7 kg H200, b380, B430, Ø11
SP46-1-B SP46-1 SP46-2-BB SP60-1-A SP60-1	SP46-1-B SP46-1-B SP46-1-A SP60-1-B	- d180 (200) × 625 - Motor 4", up to 2.2 kW (MS 4000) 2.9 kg	96898632		
SP46-2 SP46-3-C SP60-2-B SP60-2	SP46-1 SP46-2-AB SP60-1-A SP60-1 SP60-2-BB	- d180 (200) × 800 - Motor 4", 3.0 - 4.0 kW (MS 4000) 6.9 kg	96898641	97941786 d180 × 192 0.9 kg	96958370 (1 set = 2 brackets) 1.2 kg H140, b225, B260, Ø11 for pumps up to 50 kg / 4" up to 7.5 kW
SP46-3 SP46-4-C SP46-4 SP46-5 SP60-3 SP60-4	SP46-2 SP46-3-BB SP46-3 SP46-4-BC SP60-2 SP60-3-A	- d180 (200) × 1000 - Motor 4", 5.5 - 7.5 kW (MS 4000) 4.9 kg	96898642		
SP46-3 SP46-4-C SP46-4 to 12 SP60-3 to 10	SP46-3 SP46-4-BC SP46-4 to 8 SP60-3-A SP60-3 to 7	- d200 (220) × 1000 - Motor 6", up to 22 kW (MS 6000) 5.4 kg	96937744		96958381 (1 set = 2 brackets) 2.2 kg H150, b320, B370, Ø11
SP46-13 to 20 SP60-11 to 17	SP46-9 to 13 SP60-8 to 11	- d200 (220) × 1250 - Motor 6", 22-30 kW (MS 6000) 6.6 kg	96898635	97941767 d200 × 192 1.0 kg	
SP46-16 to 24 SP60-13 to 21	SP46-14 to 17 SP60-12 to 14	- d200 (220) × 1700 - Motor 6", 26-37 kW (MMS6) 9.3 kg	96898636		96958389 (1 set = 3 brackets) 3.4 kg H150, b380, B370, Ø11
SP46-21 to 24 SP60-18 to 22	SP60-12 to 17	- d200 (220) × 1700 - Motor 6", 26-37 kW (Franklin 6") 9.3 kg	96898651		

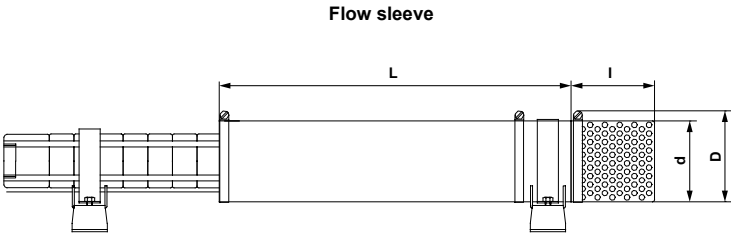
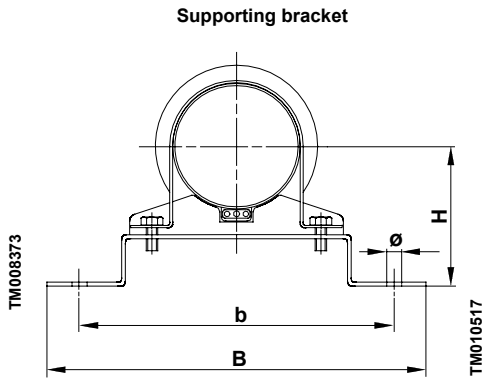


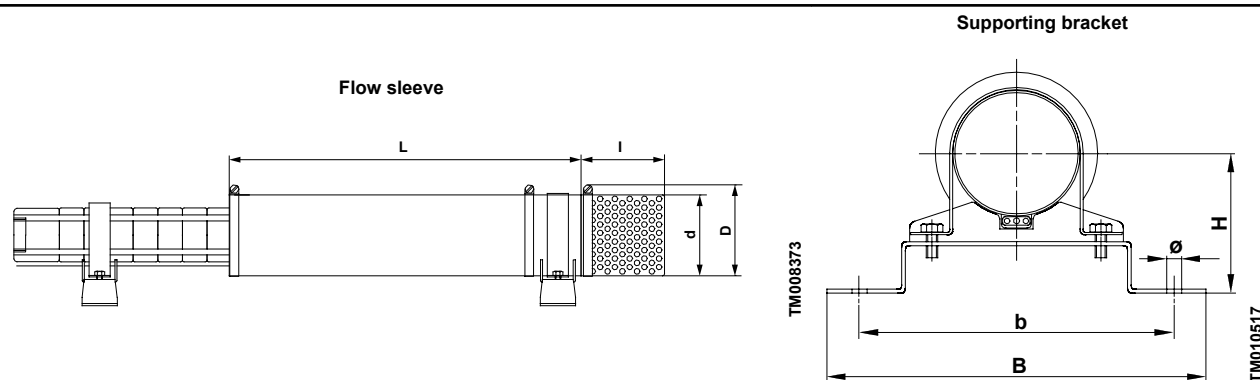
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP46-21 to 24 SP60-18 to 22	SP46-14 to 17 SP60-12 to 14	- d254 (270) × 1500 - Motor 8", 37-45 kW (MMS 8000) 9.8 kg	96900357	97941815 d256 × 325 1.9 kg	96958412 (1 set = 3 brackets) 6.0 kg H200, b320, B430, Ø11
SP60-22	SP46-18 to 19 SP60-15 to 18	- d256 (270) × 1250 - Motor 8", 45 kW (Franklin 8") 10.9 kg	96900358		98095556 (1 set = 2 brackets) 4.5 kg H200, b380, B430, Ø11
SP46-26 to 35 SP60-24 to 30	SP46-20 to 24 SP60-19 to 20	- d254 (270) × 1500 - Motor 8", 45-55 kW (MMS 8000 / Franklin 8") - Pump in sleeve d154 9.8 kg	96900360		96958411 (1 set = 3 brackets) 6.3 kg H200, b380, B430, Ø11
SP46-37	SP60-21	- d254 (270) × 1700 - Motor 8", 63-75 kW (MMS 8000 / Franklin 8") - Pump in sleeve d154 12.4 kg	96900361		
SP77-1 to 4 SP95-1 to 4B	SP77-1 SP77-2AB SP77-2-A SP77-2 SP77-3-AA SP77-3-A SP95-1-A SP95-1 SP95-2-AB SP95-2-B SP95-2 SP95-3-BB	- d210 (225) × 900 (1000) - Motor 6", up to 15 kW (MS 6000) 5.6 kg	96937749	97941757 d210 × 192 1.1 kg	96958385 (1 set = 2 brackets) 2.5 kg H160, b330, B380, Ø11
SP77-5 to 9 SP95-4 SP95-5-AB SP95-5 to 7	SP77-3 to -6-B SP95-3-B SP95-3 SP95-4-AB SP95-4 SP95-5-B	- d210 (225) × 1250 - Motor 6", up to 30 kW (MS 6000) 6.9 kg	96937750		
SP77-7 to 11 SP95-8 to 9	SP77-6 SP77-7 SP95-5 SP95-6	- d210 (225) × 1700 - Motor 6", 26-37 kW (MMS6) 10.6 kg	96898646		96958405 (1 set = 3 brackets) 6.0 kg H160, b330, B380, Ø11
SP77-10 to 12 SP95-8 to 10	SP77-6 to 8 SP95-5 to 7	- d210 (225) × 1700 - Motor 6", 37 kW (Franklin 6" Rw = Rewindable) 9 kg	96898712		

				Supporting bracket	
					
Pump type		Flow sleeve	Strainer	Supporting brackets	
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP77-10 to 15 SP95-8 to 13	SP77-6 to 10 SP95-5 to 8	- d254 (270) × 1500 - Motor 8", 37-55 kW (MMS 8000 / Franklin 8") 9.8 kg	96900372		
SP77-16 to 21 SP95-14 to 17	SP77-11 to 13 SP95-9 to 11	- d254 (270) × 1700 - Motor 8", 63-75 kW (MMS 8000 / Franklin 8") 11 kg	96900373	97941815 d256 × 325 1.9 kg	96958414 (1 set = 3 brackets) 6.0 kg H200, b380, B430, Ø11
SP77-22 SP95-18 to 20	SP77-14 SP77-15 SP95-12 SP95-13	- d254 (270) × 2000 - Motor 8", up to 92 kW (MMS 8000 / Franklin 8") 13.4 kg	96900374		
SP77-19 to 20 SP95-15 to 17	SP95-11	- d285 (300) × 1500 - Motor 10", up to 75 kW (MMS 10000) 11.4 kg	96900398	97941547 d285 × 385 2.7 kg	97695339 (1 set = 3 brackets) 10.1 kg H225, b410, B460, Ø11
SP77-22 SP95-18 to 20	SP95-12 SP95-13	- d285 (300) × 2000 - Motor 10", 92 kW (MMS 10000) 15.1 kg	96900400		
SP125-1-A R SP160-1-A R	SP125-1-A R SP160-1-A R	- d254 (270) × 1000 - Motor 6", up to 13 kW (MS 6000) 6.7 kg	96937751		96958386 (1 set = 2 brackets) 3.4 kg H200, b380, B430, Ø11
SP125-2-A SP125-2 SP125-3/A/AA SP160-2/A/AA SP160-3-AA	SP125-2-AA SP125-2-A SP125-2 SP160-1 SP160-2-AA	- d254 (270) × 1250 - Motor 6", up to 30 kW (MS 6000) 8.3 kg	96937754	97941815 d256 × 325 1.9 kg	
SP125-3/3A SP125-4/A/AA SP160-2 SP160-3/A/AA	SP125-3-AA SP125-3-A SP160-2-A SP160-3-AA	- d254 (270) × 1700 - Motor 6", 26-37 kW (MMS6) 11.4 kg	96898647		96958410 (1 set = 3 brackets) 5.2 kg H200, b380, B430, Ø11
SP125-4/A/AA SP160-3-A	SP125-3-AA SP125-3-A SP160-2-A/-2	- d254 (270) × 1700 - Motor 6", 37 kW (Franklin 6" Rw*) 11.4 kg (* Rw = Rewindable)	96900223		

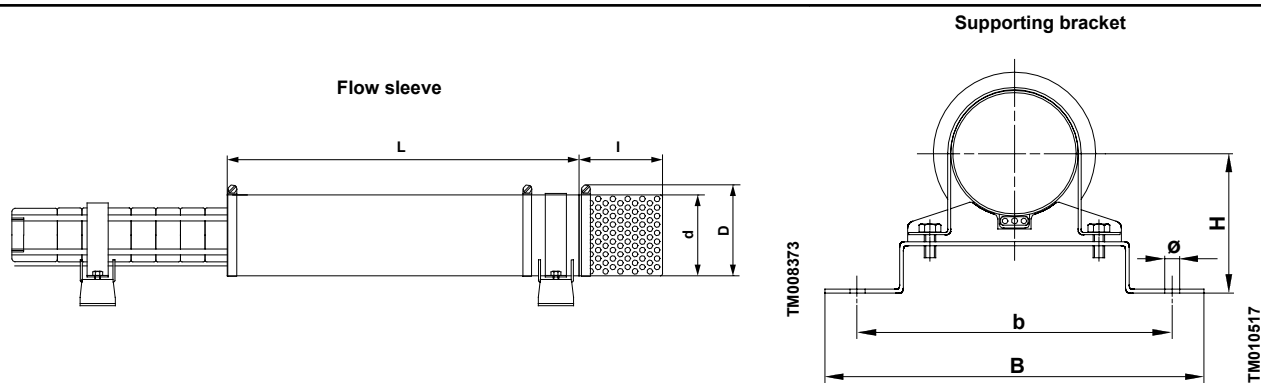


Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP125-4/A/AA SP125-5/A/AA SP125-6-AA/6-A SP160-3/3-A SP160-4/A/AA SP160-5-AA/5-A	SP125-3-AA SP125-3-A SP125-3 SP125-4-AA SP125-4-A SP160-3-AA SP160-3-A SP160-3	- d285 (300) × 1500 - Motor 8", 37-55 kW (MMS 8000 / Franklin 8") 11.4 kg	96937759		
SP125-6 SP125-7/A/AA SP125-8/A/AA SP160-5 SP160-6/A/AA SP160-7-AA	SP125-4 to 125-6AA SP160-4-AA SP160-4-A SP160-4	- d285 (300) × 1700 - Motor 8", 63-75 kW (MMS 8000 / Franklin 8") 12.8 kg	96900376	97941547 d285 × 385 2.7 kg	96958416 (1 set = 3 brackets) 10.1 kg H225, b410, B460, Ø11
SP125-9/A/AA SP125-10/A/AA SP125-11 SP160-7/A SP160-8/A/AA SP160-9/A/AA SP160-10-AA	SP125-6-A/-6 SP125-7-AA SP125-7-A SP125-7 SP160-5-AA SP160-5-A SP160-5 to 6	- d285 (300) × 2250 - Motor 8", up to 92-110 kW (MMS 8000 / Franklin 8") 16.8 kg	96900379		
SP125-7/A/AA SP125-8/A/AA SP125-9/A/AA SP125-10/A/AA SP160-6/6-A SP160-7/A/AA SP160-8/A/AA	-	- d330 (350) × 1700 - Motor 10", 75-92 kW (MMS 10000) 14.4 kg	96900401	97941751 d330 × 385 1.9 kg	96958418 (1 set = 3 brackets) 10.5 kg H225, b450, B500, Ø11
-	SP125-8 to 10 SP160-7 to 8	- d285 (300) × 2600 - Motor 8", up to 150 kW (Franklin 8") 19.1 kg	96900394	97941547 d285 × 385 1.9 kg	96958416 (1 set = 3 brackets) 10.1 kg H225, b410, B460, Ø11
SP125-12 to 13 SP160-9/A/AA SP160-10/A SP160-11	-	- d330 (350) × 2000 - Motor 10", up to 132 kW (MMS 10000) 17.2 kg	96900432	97941751 d330 × 385 1.9 kg	96958418 (1 set = 3 brackets) 10.5 kg H225, b450, B500, Ø11
SP125-14 to 17 SP160-12 to 14	SP125-10 to 11 SP160-8 to 9	- d330 (350) × 2500 - Motor 10", up to 147-170 kW (MMS 10000) 21.2 kg	96900434		
-	SP125-11 to 13 SP160-9 to 10	- d380 (400) × 2000 - Motor 12", up to 190 kW (MMS 12000) 19.6 kg	96900455	97941817 d380 × 385 4.1 kg	96958419 (1 set = 3 brackets) 12.1 kg H270, b550, B600, Ø11
SP160-15	-	- d380 (400) × 2250 - Motor 12", 190 kW (MMS 12000) 21.9 kg	96900439		

					
Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP215-1- A R	-	- d330 (350) × 1000 - Motor 6", up to 15 kW (MS 6000) 12 kg	96937756	97941751 d330 × 385 1.9 kg	97695341 (1 set = 2 brackets) 10.0 kg H250, b500, B550, Ø11
SP215-1-A SP215-1 SP215-2-AA	SP215-1-A SP215-1	- d330 (350) × 1250 - Motor 6", up to 30 kW (MS 6000) 15 kg	96937757		

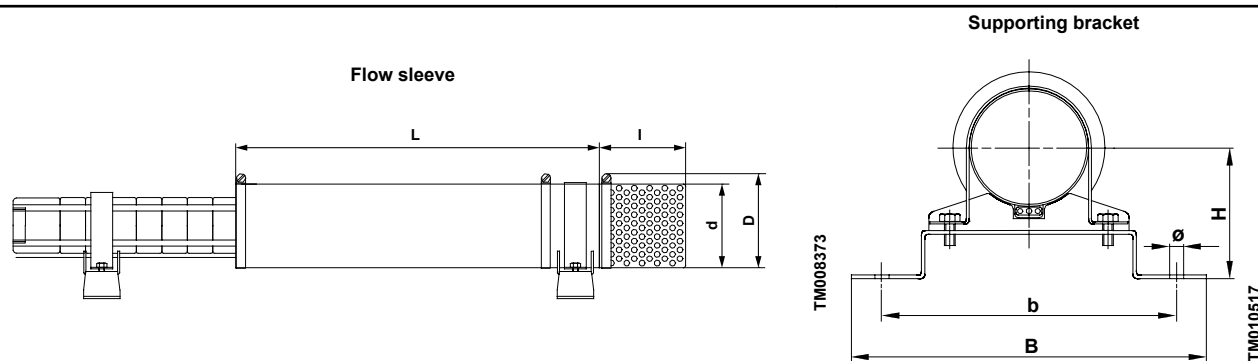


Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP215-2-AA SP215-2A	SP215-1	- d330 (350) × 1800 - Motor 6", 30-37 kW (MMS6) 16.5 kg	96898649		
SP215-2-A SP215-2	SP215-2-AA	- d330 (350) × 1800 - Motor 6", 37-45 kW (Franklin 6") 16.5 kg	96900226		
SP215-2-A R	-	- d330 (350) × 1500 - Motor 8", up to 35 kW (MMS 8000 / Franklin 8") 14.1 kg	96937758		
SP215-2-A SP215-2 SP215-3-AA SP215-3-A SP215-3 SP215-4-AA SP215-4-A SP215-4	SP215-2 SP215-3-AA	- d330 (350) × 1800 - Motor 8", up to 75 kW (MMS 8000 / Franklin 8") 14.6 kg	96900377		
SP215-5-AA SP215-5-A SP215-5 SP215-6-AA SP215-6-A	SP215-3-A SP215-3 SP215-4-AA SP215-4-A SP215-4	- d330 (350) × 2250 - Motor 8", up to 110 kW (MMS 8000 / Franklin 8") 19.1 kg	96900381	97941751 d330 × 385 1.9 kg	97757301 (1 set = 3 brackets) 10.7 kg H250, b500, B550, Ø11
SP215-7-AA SP215-7-A SP215-7	SP215-5-AA SP215-5-A	- d330 (350) × 2500 - Motor 8", 130 kW (Franklin 8") 21.2 kg	96900392		
SP215-8-AA SP215-8-A SP215-8	SP215-5	- d330 (350) × 2700 - Motor 8", 150 kW (Franklin 8") 22.8 kg	96900393		
SP215-4-AA SP215-4-A SP215-4 SP215-5-AA SP215-5-A SP215-5	-	- d330 (350) × 1800 - Motor 10", up to 92 kW (MMS 10000) 16.5 kg	96900435		
SP215-6-AA SP215-6-A SP215-6 SP215-7-AA SP215-7-A SP215-7	SP215-5-AA SP215-5-A	- d330 (350) × 2250 - Motor 10", up to 132 kW (MMS 10000) 19.1 kg	96900436		
SP215-8-AA SP215-8-A SP215-8 SP215-9-AA SP215-9-A SP215-9	SP215-5 SP215-6-AA SP215-6-A SP215-6	- d330 (350) × 2500 - Motor 10", up to 170 kW (MMS 10000) 21.2 kg	96900437		

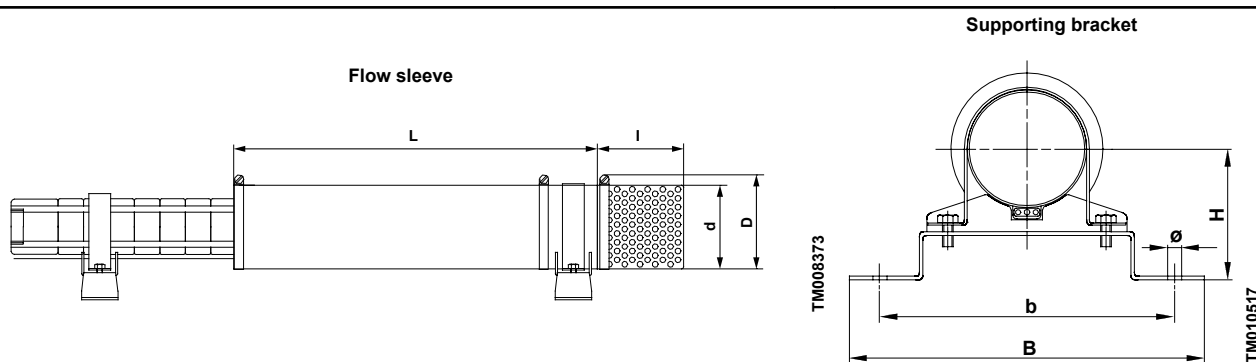


Pump type		Flow sleeve		Strainer	Supporting brackets
50 Hz	60 Hz	Description: Dimensions, d (D) × L Motor type, P2 Weight	Product number	Product number: Grundfos Dimensions d × l Weight	Product number: Grundfos Description
SP215-7-AA SP215-7-A SP215-7					
SP215-8-AA	SP215-6-AA				
SP215-8-A	SP215-6-A	• d380 (400) × 2250	96900440	97941817 d380 × 385 4.0 kg	96958420 (1 set = 3 brackets) 12 kg H270, b550, B600, Ø11
SP215-8	SP215-6	• Motor 12", up to 190 kW (MMS 12000)			
SP215-9-AA	SP215-7-AA	• 21.9 kg			
SP215-9-A	SP215-7-A				
SP215-9	SP215-7				
SP215-10-AA SP215-10-A SP215-10					
SP215-11	-	• d380 (400) × 2500 • Motor 12", 220 kW (MMS 12000) • 24.2 kg	96900441		

8. SPE flow sleeve, standard version EN 1.4301 / AISI 304

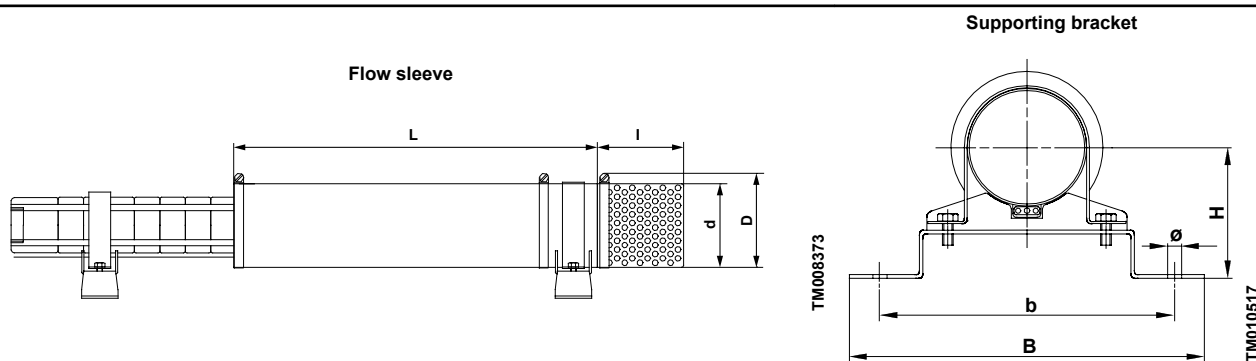


Pump type	Flow sleeve	Strainer	Supporting brackets
	Dimensions, d (D) × L Motor type, P2 Weight	Product number Dimensions d × l Weight	Product number Description
SPE18-1 to 12 SPE32-1 to 7 SPE18-13 to 29 SPE32-8 to 19	- d180 (200) × 800 - Motor 6", up to 18.5kW (MS 6000P) 4.0 kg	96937242	
SPE18-30 to 40 SPE32-20 to 32	- d180 (200) × 1000 - Motor 6", 22-30 kW (MS 6000P) 4.9 kg	96937245	
SPE32-33 to 37	- d180 (200) × 1250 - Motor 6", 37 kW (MS 6000P) 6.0 kg	96937249	
SPE18-41 to 48	- d200 (220) × 1000 - Motor 6", 26-30 kW (MS 6000P) - Pump in sleeve d154 6.7 kg	93171870	
SPE18-49 to 58 SPE32-38 to 46	- d200 (220) × 1250 - Motor 6", 37-45 kW (MS 6000P) - Pump in sleeve d154 6.6 kg	96937246	
SPE46-1 to 4 SPE60-1 to 3 SPE46-5 to 11 SPE60-4 to 8	- d200 (220) × 800 - Motor 6", 4-18.5 kW (MS 6000P) 5.4 kg	96937322	
SPE46-12 to 18 SPE60-9 to 18	- d200 (220) × 1000 - Motor 6", 22-30 kW (MS 6000P) 6.4 kg	96937323	
SPE46-19 to 24 SPE60-16 to 23	- d200 (220) × 1250 - Motor 6", 37-45 kW (MS 6000P) 6.6 kg	96937317	
SPE77-1 SPE95-1 SPE77-2 to 4 SPE95-2 to 3	- d210 (225) × 1000 - Motor 6", 4-18.5 kW (MS 6000P) 5.6 kg	96937332	
SPE77-5 to 7 SPE95-4 to 6 SPE77-8 to 11 SPE95-7 to 9	- d210 (225) × 1250 - Motor 6", up to 22-45 kW (MS 6000P) 6.9 kg	96937440	
		97942218 d180 × 192 0.9 kg	96957529 (1 set = 2 brackets) 2.1 kg
		97942247 d200 × 192 1.0 kg	96957544 (1 set = 2 brackets) 2.3 kg
		97942247 d200 × 192 1.0 kg	96957545 (1 set = 2 brackets) 2.2 kg H150, b320, B370, Ø11
		97942261 d210 × 192 1.1 kg	96957546 (1 set = 2 brackets) 2.5 kg H160, b330, B380, Ø11

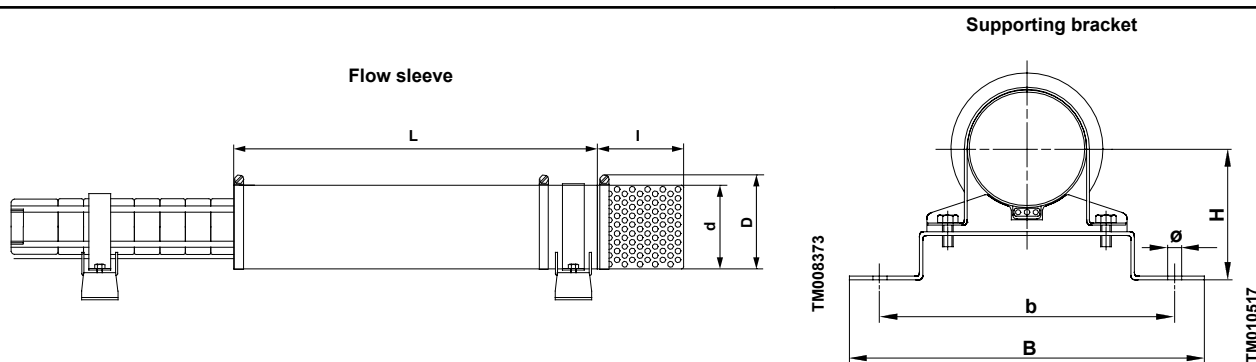


Pump type	Flow sleeve	Strainer	Supporting brackets
	Dimensions, d (D) × L Motor type, P2 Weight	Product number Dimensions d × l Weight	Product number Description
SPE125-1 SPE160-1	- d254 (270) × 1000 - Motor 6", 13-18.5 kW (MS 6000P) 6.7 kg	96937441	96957548 (1 set = 2 brackets)
SPE125-2 SPE160-2 SPE125-3 to 4 SPE160-3	- d254 (270) × 1250 - Motor 6", 22-45 kW (MS 6000P) 8.3 kg	97942263 d256 × 325 1.9 kg	3.4 kg H200, b380, B430, Ø11
SPE215-1 SPE215-2	- d330 (350) × 1250 - Motor 6", 22-45 kW (MS 6000P) 10.6 kg	97942268 d330 × 385 1.9 kg	96958364 (1 set = 2 brackets) 10.0 kg H250, b500, B550, Ø11

9. SPE flow sleeve, R-version EN 1.4539 / AISI 904L



Pump type	Flow sleeve	Strainer	Supporting brackets
	Dimensions, d (D) × L Motor type, P2 Weight	Product number Dimensions d × l Weight	Product number Description
SPE18-1 to 12 SPE32-1 to 7 SPE18-13 to 29 SPE32-8 to 19	- d180 (200) × 800 - Motor 6", up to 18.5kW (MS 6000P) 4.0 kg	96937689	
SPE18-30 to 40 SPE32-20 to 32	- d180 (200) × 1000 - Motor 6", 22-30 kW (MS 6000P) 4.9 kg	96937691	
SPE32-33 to 37	- d180 (200) × 1250 - Motor 6", 37 kW (MS 6000P) 6.0 kg	96898633	
SPE18-41 to 48	- d200 (220) × 1000 - Motor 6", 26-30 kW (MS 6000P) - Pump in sleeve d154 6.7 kg	93171875	
SPE18-49 to 58 SPE32-38 to 46	- d200 (220) × 1250 - Motor 6", 37-45 kW (MS 6000P) - Pump in sleeve d154 6.6 kg	96937722	
SPE46-1 to 4 SPE60-1 to 3 SPE46-5 to 11 SPE60-4 to 8	- d200 (220) × 800 - Motor 6", 4-18.5 kW (MS 6000P) 5.4 kg	96937744	
SPE46-12 to 18 SPE60-9 to 18	- d200 (220) × 1000 - Motor 6", 22-30 kW (MS 6000P) 6.4 kg	96937744	
SPE46-19 to 24 SPE60-16 to 23	- d200 (220) × 1250 - Motor 6", 37-45 kW (MS 6000P) 6.6 kg	96898635	
SPE77-1 SPE95-1 SPE77-2 to 4 SPE95-2 to 3	- d210 (225) × 1000 - Motor 6", 4-18.5 kW (MS 6000P) 5.6 kg	96937749	
SPE77-5 to 7 SPE95-4 to 6 SPE77-8 to 11 SPE95-7 to 9	- d210 (225) × 1250 - Motor 6", up to 22-45 kW (MS 6000P) 6.9 kg	96937750	
		97941786 d180 × 192 0.9 kg	96958375 (1 set = 2 brackets) 2.1 kg
		97941767 d200 × 192 1.0 kg	96960265 (1 set = 2 brackets) 2.3 kg
		97941767 d200 × 192 1.0 kg	96958381 (1 set = 2 brackets) 2.2 kg H150, b320, B370, Ø11
		97941757 d210 × 192 1.1 kg	96958385 (1 set = 2 brackets) 2.5 kg H160, b330, B380, Ø11

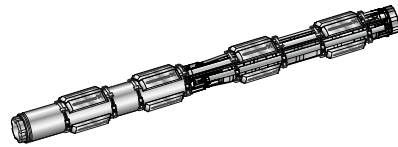


Pump type	Flow sleeve	Strainer	Supporting brackets
	Dimensions, d (D) × L Motor type, P2 Weight	Product number Dimensions d × l Weight	Product number Description
SPE125-1 SPE160-1	- d254 (270) × 1250 - Motor 6", 13-18.5 kW (MS 6000P) 6.7 kg	96937751	96958386 (1 set = 2 brackets)
SPE125-2 SPE160-2 SPE125-3 to 4 SPE160-3	- d254 (270) × 1000 - Motor 6", 22-45 kW (MS6000P) 8.3 kg	97941815 d256 × 325 1.9 kg	3.4 kg H200, b380, B430, Ø11
SPE215-1 SPE215-2	- d330 (350) × 1250 - Motor 6", 22-45 kW (MS 6000P) 10.6 kg	97941751 d330 × 385 1.9 kg	97695341 (1 set = 2 brackets) 10.0 kg H250, b500, B550, Ø11

10. Zinc anodes

Galvanic cathodic protection

Applications



TM078808

Zinc cathodic protection

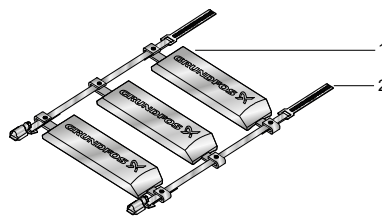
Galvanic cathodic protection enables protection of SQF, SP A, SP and SPG pumps as well as submersible motors against corrosion caused by chloride-containing liquids, such as seawater and brackish water.

Applicable on these versions:	
Pump/motor	Version
Pump	N or R version
Motor, Grundfos	N or R version

Pumped liquids

Water containing more than 1500 ppm chloride at temperatures up to 35 °C.
Galvanic cathodic protection is not recommended in liquids with a pH value lower than 6 and higher than 9.

Construction



TM078809

Anode string

Pos.	Description	Part
1	1 pc. zinc anode cast around the clamp	PN 99722879
2	2 pcs. stainless-steel clamps	PN 99812400



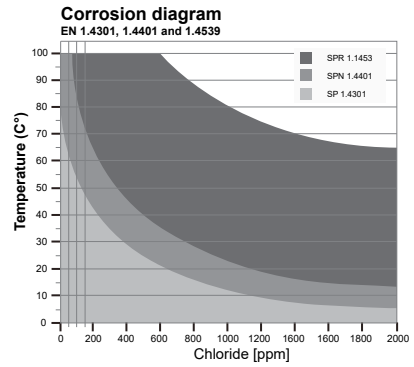
TM083095

Anode kit with 2 anodes

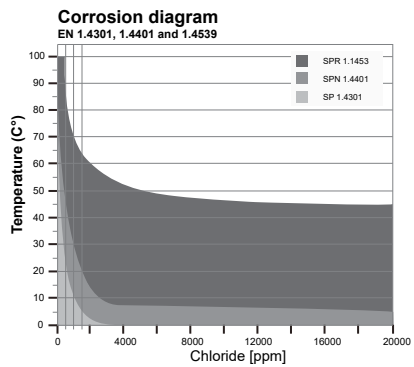
Anode kits

Kit no.	Kit contents
92836041	1 × 99812400, 2 × 99722879
92836043	1 × 99812400, 4 × 99722879
92621545	1 × 99812400, 6 × 99722879

During operation, the size of the zinc anodes is reduced and gradually the anodes become covered by corrosion products obstructing the direct metallic contact between the anode and the pump/motor. To counteract this, the metallic contact must be ensured through the clamp keeping tight contact with the pump/motor by the spring device.



TM079659



TM079660

Fitting the anode strings

The anode strings are to be fitted according to the installation and operating instructions.

The number of anode strings to be fitted is shown in Anode strings on pumps and Position of anode strings on motors.

Important: Ensure that the anode strings are fastened tightly and the electric/metallic contact between the clamp and the pump/motor is correct.

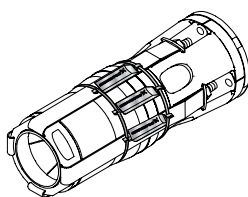
The diameter of the pump/motor is increased by a minimum of 40 mm when the anode string is fitted.

Related information

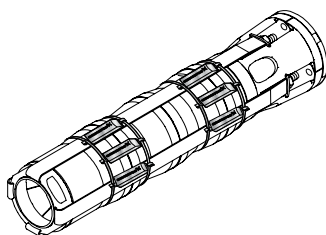
[Position of anode strings on motors](#)

[Anode strings on pumps](#)

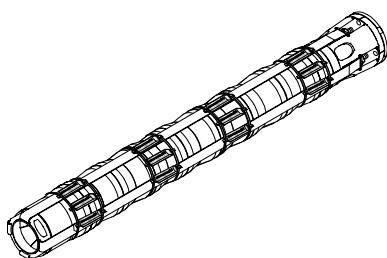
Position of anode strings on pumps



One anode string



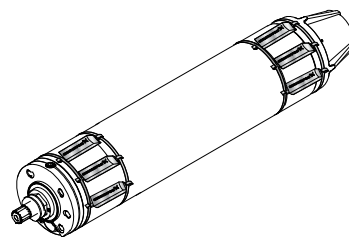
Two anode strings



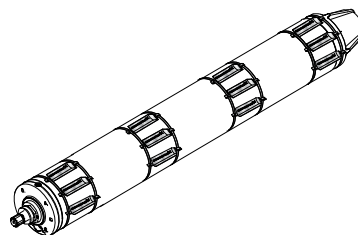
More than two anode strings

The distances between the anode strings must be identical.

Position of anode strings on motors



Two anode strings on motors



More than two strings on motor

Maintenance

Anode life

The life of a zinc anode is 1 to 4 years, depending on the operating conditions.

Inspection

Inspections must be made at regular intervals to ensure the functioning of the galvanic cathodic protection system. The first inspection must be made after six months and subsequently approximately once a year.

Precipitation

White and yellow corrosion products build up on the anodes as these are reduced in size. Furthermore, a thin lime incrustation may build up on the pump. However, such precipitation is harmless.

Replacing the anode string

To ensure a proper electric/metallic contact between the clamp and the pump/motor, the surface must be cleaned thoroughly before a new anode string is fitted.

Anode strings on pumps

The following sections show the number of anode strings required per pump and the corresponding product numbers.

TM078817

TM078818

TM078814

TM078815

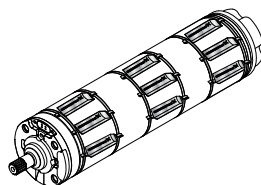
TM078816

Product range

Zinc anodes for SP pumps				
Pump type	Pump diameter	Length	Number of zinc anode bands	Ordering
				Product number
SP1A to SP14	4"	Up to 1000 mm	1	92836041
	4"	1000 to 2000 mm	2	92836041
	4"	2000 to 3000 mm	3	92836041
	4"	3000 to 4000 mm	4	92836041
	4"	4000 to 5000 mm	5	92836041
	4"	5000 to 6000 mm	6	92836041
SP17 to SP60	6"	Up to 1000 mm	1	92836043
	6"	1000 to 2000 mm	2	92836043
	6"	2000 to 3000 mm	3	92836043
	6"	3000 to 4000 mm	4	92836043
	6"	4000 to 5000 mm	5	92836043
	6"	5000 to 6000 mm	6	92836043
SP77 to SP95	8"	Up to 1000 mm	1	92836043
	8"	1000 to 2000 mm	2	92836043
	8"	2000 to 3000 mm	3	92836043
	8"	3000 to 4000 mm	4	92836043
	8"	4000 to 5000 mm	5	92836043
	8"	5000 to 6000 mm	6	92836043
SP125 to SP215	10"	Up to 1000 mm	1	92621545
	10"	1000 to 2000 mm	2	92621545
	10"	2000 to 3000 mm	3	92621545
	10"	3000 to 4000 mm	4	92621545
	10"	4000 to 5000 mm	5	92621545
	10"	5000 to 6000 mm	6	92621545
SP270 to SP360	12"	Up to 1000 mm	1	92621545
	12"	1000 to 2000 mm	2	92621545
	12"	2000 to 3000 mm	3	92621545
	12"	3000 to 4000 mm	4	92621545
	12"	4000 to 5000 mm	5	92621545
	12"	5000 to 6000 mm	6	92621545

Anode strings on motors

The table below shows the number of anode strings required per motor and the corresponding product numbers.



TM078812

Anode strings on MS motor

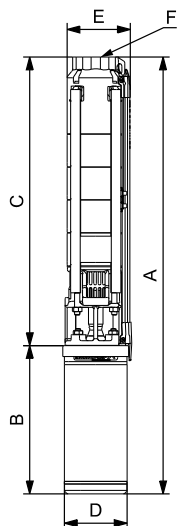
Zinc anodes for MS - MMS motors			
Motor	Length	Number of zinc anode bands	Ordering
			Product number
MS402	Up to 350 mm	1	92836041
MS4000	Up to 1000 mm	1	92836041
MS6000	Up to 1000 mm	1	92836043
MMS6	Up to 1000 mm	1	92836043
MMS6	1000 to 1400 mm	2	92836043
MMS8000	Up to 1000 mm	1	92836043
MMS8000	1000 to 2060 mm	2	92836043
MMS10000	Up to 2000 mm	2	92621545
MMS10000	2000 to 2500 mm	3	92621545
MMS12000	Up to 2000 mm	2	92621545
MMS12000	2000 to 2300 mm	3	92621545

Example of dimensions of some SP pumps and MS motors

Pump type ²³⁾	Motor		Dimensions [mm]					Net weight [Kg]
	Type	Power [kW]	C	B	A	D	E ²⁴⁾	
Single-phase, 1 × 230 V / 1 × 240 V								
SP 14-4	MS 402	1.1	538	346	884	95	101	18.7
SP 14-6	MS 402	1.5	688	346	1034	95	101	20.2
SP 14-8	MS 4000	2.2	838	577	1415	95	101	32.3
Three-phase, 3 × 220-230 V 50 Hz / 3 × 380-400-415 V 50 Hz								
SP 14-4	MS 402	1.1	538	306	844	95	101	16.9
SP 14-6	MS 402	1.5	688	346	1034	95	101	20.2
SP 14-8	MS 402	2.2	838	346	1084	95	101	23.2
SP 14-4	MS 4000	1.1	538	417	955	95	101	21.1
SP 14-6	MS 4000	1.5	688	417	1105	95	101	22.7
SP 14-8	MS 4000	2.2	838	457	1295	95	101	26.3
SP 14-11	MS 4000	3	1063	497	1560	95	101	30.6
SP 14-13	MS 4000	3	1213	497	1710	95	101	32.2
SP 14-15	MS 4000	4	1363	577	1940	95	101	37.8
SP 14-17	MS 4000	4	1513	577	2090	95	101	39.5
SP 14-20	MS 4000	5.5	1738	677	2415	95	101	46.9
SP 14-23	MS 4000	5.5	1963	677	2640	95	101	49.2
SP 14-27	MS 4000	7.5	2263	777	3040	95	101	56.4
SP 14-31	MS 4000	7.5	2563	777	3340	95	101	59.6
SP 14-20	MS 6000	5.5	1801	547	2348	139.5	139.5	57.3
SP 14-23	MS 6000	5.5	2026	547	2573	139.5	139.5	59.6
SP 14-27	MS 6000	7.5	2326	577	2903	139.5	139.5	65.8
SP 14-31	MS 6000	7.5	2626	577	3203	139.5	139.5	69.0

Technical drawing of a pump assembly showing dimensions A, B, C, D, E, and F. Dimension A is the total height, B is the height of the lower section, C is the height of the upper section, D is the diameter of the base, E is the height of the top flange, and F is the height of the top cap.

TM065396



TM065396

²³⁾ The pump types above are also available in N- and R-versions.

²⁴⁾ E = maximum diameter of pump inclusive of cable guard and motor.

11. Cable sizing

Cables

Grundfos offers submersible drop cables for all applications: 4-core cable, single leads.

Cables for Grundfos 4" submersible motors are available with or without plugs. The submersible drop cable is chosen according to application and installation type. See 3.12 Submersible drop cable.

Related information

[Submersible drop cable](#)

Tables indicating cable dimension in borehole

The tables indicate the maximum length of drop cables in metres from motor starter to pump at direct-on-line starting at different cable dimensions.

If star-delta starting is used, the current is reduced by $\sqrt{3}$ ($I \times 0.58$). This means that the cable length may be $\sqrt{3}$ ($L \times 1.73$) times longer than indicated in the tables.

If, for example, the operating current is 10 % lower than the full-load current, the cable may be 10 % longer than indicated in the tables.

The calculation of the cable length is based on a maximum voltage drop of 1 to 3 % of the maximum current capacity and a water temperature of maximum 30 °C.

To minimise operating losses, the cable cross-section may be increased compared to what is indicated in the tables. This is only economical if the borehole provides the necessary space, and if the operational time of the pump is long, especially if the operating voltage is below the rated voltage.

The table values are calculated based on the formula:



TM076259

Cable sizing tool

Maximum cable length for a single-phase submersible pump:

$$L = \frac{U \times \Delta U}{I \times 2 \times 100 \times \left(\cos \varphi \times \frac{p}{q} + \sin \varphi \times X_L \right)} [\text{m}]$$

Maximum cable length for a three-phase submersible pump:

$$L = \frac{U \times \Delta U}{I \times 1.73 \times 100 \times \left(\cos \varphi \times \frac{p}{q} + \sin \varphi \times X_L \right)} [\text{m}]$$

Formula designations

U	=	Rated voltage [V]
ΔU	=	Voltage drop [%]
I	=	Rated current of the motor [A]
$\cos \varphi$	=	Power factor
ρ	=	Specific resistance: 0.025 [$\Omega \text{ mm}^2$]
q	=	Cross-section of submersible drop cable [mm^2]
$\sin \varphi$	=	$\sqrt{1 - \cos^2 \varphi}$
X_L	=	Inductive resistance: 0.078×10^{-3} [Ω/m].

Example

Motor size:	30 kW, MMS 8000
Starting method:	Direct on line
Rated voltage (U):	3 × 400 V, 50 Hz
Voltage drop (ΔU):	3 %
Rated current (I):	64.0 A
Power factor ($\cos \varphi$):	0.85
Specific resistance (ρ):	0.025
Cross-section (q):	25 mm^2
$\sin \varphi$:	0.54
Inductive resistance (X_L):	0.078×10^{-3} [Ω/m]

$$L = \frac{400 \times 3}{64.0 \times 1.73 \times 100 \times \left(0.85 \times \frac{0.025}{25} + 0.54 \times 0.078 \times 10^{-3} \right)}$$

$$L = 120 \text{ m.}$$

Calculation of cable cross-section

Formula designations

U	=	Rated voltage [V]
ΔU	=	Voltage drop [%]
I	=	Rated current of the motor [A]
cos φ	=	Power factor
1/χ	=	
ρ	=	Materials of cable: Copper: χ = 40 m/Ω × mm ²
q	=	Cross-section [mm ²]
sin φ	=	$\sqrt{1 - \cos^2 \varphi}$
X _L	=	Inductive resistance 0.078 × 10 ⁻³ [Ω/m]
L	=	Length of cable [m]
Δp	=	Power loss [W].

For calculation of the cross-section of the submersible drop cable, use the following formula:

Direct-on-line

$$q = \frac{I \times 1.73 \times 100 \times L \times \rho \times \cos \varphi}{U \times \Delta U - (I \times 100 \times L \times X_L \times \sin \varphi)}$$

Star-delta

$$q = \frac{I \times 100 \times L \times \rho \times \cos \varphi}{U \times \Delta U - (I \times 100 \times L \times X_L \times \sin \varphi)}$$

For the values of the rated current (I) and the power factor (cos φ), see the tables in Cable dimensions at 3 × 400 V, 50 Hz, DOL, voltage drop of 3 %.

Related information

Cable dimensions at 3 × 400 V, 50 Hz, DOL, voltage drop of 3 %

Calculation of the power loss

For calculation of the power loss in the submersible drop cable, use the following formula:

$$\Delta p = \frac{3 \times L \times \rho \times I^2}{q}$$

Example

Motor size:	45 kW, MMS 8000
Voltage:	3 × 400 V, 50 Hz
Starting method:	Direct on line
Rated current (I _n):	96.5 A
Required cable length (L):	200 m
Water temperature:	30 °C.

Cable selection

Choice A:	3 × 150 mm ² .
Choice B:	3 × 185 mm ² .

Calculation of power loss

Choice A

$$\Delta p_A = \frac{3 \times L \times \rho \times I^2}{q}$$

$$\Delta p_A = \frac{3 \times 200 \times 0.02 \times 96.5^2}{150}$$

Choice B

$$\Delta p_B = \frac{3 \times 200 \times 0.02 \times 96.5^2}{185}$$

Savings

Operating hours/year: h = 4000.

Annual saving (A):

$$A = (\Delta p_A - \Delta p_B) \times h = (745 \text{ W} - 604 \text{ W}) \times 4000 = 564,000 \text{ Wh} = 564 \text{ kWh.}$$

By choosing the cable size 3 × 185 mm² instead of 3 × 150 mm², an annual saving of 564 kWh may be achieved.

Operating time: 10 years.

Saving after 10 years (A₁₀):

$$A_{10} = A \times 10 = 564 \times 10 = 5640 \text{ kWh.}$$

Calculate the saved amount in the local currency.

Cable dimensions at 3 × 400 V, 50 Hz, DOL, voltage drop of 3 %

Motor	kW	I _n [A]	Cos φ 100 %	Dimensions [mm] ²⁵⁾															
				1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240	300
4"	0.37	1.4	0.64	462	767														
4"	0.55	2.2	0.64	294	488	777													
4"	0.75	2.3	0.72	250	416	662	987												
4"	1.1	3.4	0.72	169	281	448	668												
4"	1.5	4.2	0.75	132	219	348	520	857											
4"	2.2	5.5	0.82	92	153	244	364	602	951										
4"	3	7.85	0.77	69	114	182	271	447	705										
4"	4	9.6	0.8	54	90	143	214	353	557	853									
4"	5.5	13	0.81	39	66	104	156	258	407	624	855								
4"	7.5	18.8	0.78	28	47	75	112	185	291	445	609	841							
6"	4	9.2	0.82	55	91	146	218	359	566	867									
6"	5.5	13.6	0.77	40	66	105	157	258	407	622	850								
6"	7.5	17.6	0.8	29	49	78	117	193	304	465	637	882							
6"	9.2	21.8	0.81	23	39	62	93	154	243	372	510	706	950						
6"	11	24.8	0.83		34	53	80	132	209	320	440	610	823						
6"	13	30	0.81		28	45	68	112	176	270	370	513	690	893					
6"	15	34	0.82			39	59	97	154	236	324	449	604	783	947				
6"	18.5	42	0.81				48	80	126	193	265	366	493	638	770	914			
6"	22	48	0.84				41	67	107	164	225	313	422	549	665	793	927		
6"	26	57	0.84					57	90	138	189	263	355	462	560	667	781	937	
6"	30	66.5	0.83					49	78	119	164	227	307	398	482	574	670	803	926
6"	37	85.5	0.79						63	97	133	183	246	317	382	452	525	624	714
8"	22	48	0.84				41	67	107	164	225	313	422	549	665	793	927		
8"	26	56.5	0.85					57	90	138	189	263	356	464	563	672	787	947	
8"	30	64	0.85					50	79	122	167	233	314	409	497	593	695	836	968
8"	37	78.5	0.85						65	99	136	190	256	334	405	483	567	682	789
8"	45	96.5	0.82						54	83	114	158	213	276	334	396	462	553	636
8"	55	114	0.85							68	94	131	177	230	279	333	390	469	544
8"	63	132	0.83								83	115	155	201	243	289	338	404	466
8"	75	152	0.86								70	97	132	171	208	249	292	353	409
8"	92	186	0.86									79	107	140	170	204	239	288	335
8"	110	224	0.87										89	116	141	169	198	240	279
10"	75	156	0.84								69	96	130	169	205	244	285	343	396
10"	92	194	0.82									79	106	137	166	197	230	275	316
10"	110	228	0.84										89	116	140	167	195	234	271
10"	132	270	0.84											98	118	141	165	198	229
10"	147	315	0.81												103	122	142	169	194
10"	170	365	0.81													105	122	146	168
10"	190	425	0.79														106	125	144
12"	147	305	0.83												105	125	146	175	202
12"	170	345	0.85												92	110	129	155	180
12"	190	390	0.84													98	114	137	158
12"	220	445	0.85														100	120	139
12"	250	505	0.85															106	123
Max. current for cable [A] ²⁶⁾				23	30	41	53	74	99	131	162	202	250	301	352	404	461	547	633

²⁵⁾ All figures are calculated based on a temperature of 30 °C.

²⁶⁾ At particularly favourable heat dissipation conditions. Maximum cable length in metres from motor starter to pump.

Note: for motors with star-delta starting, the cable length can be calculated by multiplying the relevant cable length from the above table by $\sqrt{3}$.

12. Table of head losses

Head losses in ordinary water pipes

Upper figures indicate the velocity of water in m/sec.

Lower figures indicate head loss in metres per 100 metres of straight pipes.

Quantity of water			Head losses in ordinary water pipes											
m³/h	Litres/min.	Litres/sec.	Nominal pipe diameter in inches and internal diameter in [mm]											
			1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"
			15.75	21.25	27.00	35.75	41.25	52.50	68.00	80.25	92.50	105.0	130.0	155.5
0.6	10	0.16	0.855	0.470	0.292									
			9.910	2.407	0.784									
0.9	15	0.25	1.282	0.705	0.438	0.249								
			20.11	4.862	1.570	0.416								
1.2	20	0.33	1.710	0.940	0.584	0.331	0.249							
			33.53	8.035	2.588	0.677	0.346							
1.5	25	0.42	2.138	1.174	0.730	0.415	0.312							
			49.93	11.91	3.834	1.004	0.510							
1.8	30	0.50	2.565	1.409	0.876	0.498	0.374	0.231						
			69.34	16.50	5.277	1.379	0.700	0.223						
2.1	35	0.58	2.993	1.644	1.022	0.581	0.436	0.269						
			91.54	21.75	6.949	1.811	0.914	0.291						
2.4	40	0.67		1.879	1.168	0.664	0.499	0.308						
				27.66	8.820	2.290	1.160	0.368						
3.0	50	0.83		2.349	1.460	0.830	0.623	0.385	0.229					
				41.40	13.14	3.403	1.719	0.544	0.159					
3.6	60	1.00		2.819	1.751	0.996	0.748	0.462	0.275					
				57.74	18.28	4.718	2.375	0.751	0.218					
4.2	70	1.12		3.288	2.043	1.162	0.873	0.539	0.321	0.231				
				76.49	24.18	6.231	3.132	0.988	0.287	0.131				
4.8	80	1.33			2.335	1.328	0.997	0.616	0.367	0.263				
					30.87	7.940	3.988	1.254	0.363	0.164				
5.4	90	1.50			2.627	1.494	1.122	0.693	0.413	0.269				
					38.30	9.828	4.927	1.551	0.449	0.203				
6.0	100	1.67			2.919	1.660	1.247	0.770	0.459	0.329	0.248			
					46.49	11.90	5.972	1.875	0.542	0.244	0.124			
7.5	125	2.08			3.649	2.075	1.558	0.962	0.574	0.412	0.310	0.241		
					70.41	17.93	8.967	2.802	0.809	0.365	0.185	0.101		
9.0	150	2.50				2.490	1.870	1.154	0.668	0.494	0.372	0.289		
						25.11	12.53	3.903	1.124	0.506	0.256	0.140		
10.5	175	2.92				2.904	2.182	1.347	0.803	0.576	0.434	0.337		
						33.32	16.66	5.179	1.488	0.670	0.338	0.184		
12	200	3.33				3.319	2.493	1.539	0.918	0.659	0.496	0.385	0.251	
						42.75	21.36	6.624	1.901	0.855	0.431	0.234	0.084	
15	250	4.17				4.149	3.117	1.924	1.147	0.823	0.620	0.481	0.314	
						64.86	32.32	10.03	2.860	1.282	0.646	0.350	0.126	
18	300	5.00					3.740	2.309	1.377	0.988	0.744	0.577	0.377	0.263
							45.52	14.04	4.009	1.792	0.903	0.488	0.175	0.074
24	400	6.67					4.987	3.078	1.836	1.317	0.992	0.770	0.502	0.351
							78.17	24.04	6.828	3.053	1.530	0.829	0.294	0.124
30	500	8.33						3.848	2.295	1.647	1.240	0.962	0.628	0.439
								36.71	10.40	4.622	2.315	1.254	0.445	0.187
36	600	10.0						4.618	2.753	1.976	1.488	1.155	0.753	0.526
								51.84	14.62	6.505	3.261	1.757	0.623	0.260
42	700	11.7							3.212	2.306	1.736	1.347	0.879	0.614
									19.52	8.693	4.356	2.345	0.831	0.347
48	800	13.3							3.671	2.635	1.984	1.540	1.005	0.702
										25.20	11.18	5.582	3.009	1.066
54	900	15.0							4.130	2.964	2.232	1.732	1.130	0.790
										31.51	13.97	6.983	3.762	1.328
60	1000	16.7							4.589	3.294	2.480	1.925	1.256	0.877
										38.43	17.06	8.521	4.595	1.616
75	1250	20.8								4.117	3.100	2.406	1.570	1.097
											26.10	13.00	7.010	2.458

Quantity of water			Head losses in ordinary water pipes										
m³/h	Litres/min.	Litres/sec.	Nominal pipe diameter in inches and internal diameter in [mm]										
90	1500	25.0	4.941 3.720 2.887 1.883 1.316										
			36.97 18.42 9.892 3.468 1.444										
105	1750	29.2	4.340 3.368 2.197 1.535										
			24.76 13.30 4.665 1.934										
120	2000	33.3	4.960 3.850 2.511 1.754										
			31.94 17.16 5.995 2.496										
150	2500	41.7	4.812 3.139 2.193										
			26.26 9.216 3.807										
180	3000	50.0	3.767 2.632										
			13.05 5.417										
240	4000	66.7	5.023 3.509										
			22.72 8.926										
300	5000	83.3	4.386										
			14.42										
90° bends, slide valves		1.0	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	2.0	2.5
T-pieces, non-return valves		4.0	4.0	4.0	5.0	5.0	5.0	6.0	6.0	6.0	7.0	8.0	9.0

The table is calculated in accordance with H. Lang's new formula $a = 0.02$ and for a water temperature of 10 °C.

The head loss in bends, slide valves, T-pieces and non-return valves is equivalent to the metres of straight pipes stated in the last two lines of the table. To find the head loss in foot valves, multiply the loss in T-pieces by two.

Head losses in plastic pipes

Upper figures indicate the velocity of water in m/sec.

Lower figures indicate head loss in metres per 100 metres of straight pipes.

Quantity of water			PELM/PEH PN 10											
m³/h	Litres/min.	Litres/sec.	PELM					PEH						
			25 20.4	32 26.2	40 32.6	50 40.8	63 51.4	75 61.4	90 73.6	110 90.0	125 102.2	140 114.6	160 130.8	180 147.2
0.6	10	0.16	0.49 1.8	0.30 0.66	0.19 0.27	0.12 0.085								
0.9	15	0.25	0.76 4.0	0.46 1.14	0.3 0.6	0.19 0.18	0.12 0.63							
1.2	20	0.33	1.0 6.4	0.61 2.2	0.39 0.9	0.25 0.28	0.16 0.11							
1.5	25	0.42	1.3 10.0	0.78 3.5	0.5 1.4	0.32 0.43	0.2 0.17	0.14 0.074						
1.8	30	0.50	1.53 13.0	0.93 4.6	0.6 1.9	0.38 0.57	0.24 0.22	0.17 0.092						
2.1	35	0.58	1.77 16.0	1.08 6.0	0.69 2.0	0.44 0.70	0.28 0.27	0.2 0.12						
2.4	40	0.67	2.05 22.0	1.24 7.5	0.80 3.3	0.51 0.93	0.32 0.35	0.23 0.16	0.16 0.063					
3.0	50	0.83	2.54 37.0	1.54 11.0	0.99 4.8	0.63 1.40	0.4 0.50	0.28 0.22	0.2 0.09					
3.6	60	1.00	3.06 43.0	1.85 15.0	1.2 6.5	0.76 1.90	0.48 0.70	0.34 0.32	0.24 0.13	0.16 0.050				
4.2	70	1.12	3.43 50.0	2.08 18.0	1.34 8.0	0.86 2.50	0.54 0.83	0.38 0.38	0.26 0.17	0.18 0.068				
4.8	80	1.33		2.47 25.0	1.59 10.5	1.02 3.00	0.64 1.20	0.45 0.50	0.31 0.22	0.2 0.084				
5.4	90	1.50		2.78 30.0	1.8 12.0	1.15 3.50	0.72 1.30	0.51 0.57	0.35 0.26	0.24 0.092	0.18 0.05			
6.0	100	1.67		3.1 39.0	2.0 16.0	1.28 4.6	0.8 1.80	0.56 0.73	0.39 0.30	0.26 0.12	0.2 0.07			
7.5	125	2.08		3.86 50.0	2.49 24.0	1.59 6.6	1.00 2.50	0.70 1.10	0.49 0.50	0.33 0.18	0.25 0.10	0.20 0.055		
9.0	150	2.50			3.00 33.0	1.91 8.6	1.20 3.5	0.84 1.40	0.59 0.63	0.39 0.24	0.30 0.13	0.24 0.075		
10.5	175	2.92			3.5 38.0	2.23 11.0	1.41 4.3	0.99 1.80	0.69 0.78	0.46 0.30	0.36 0.18	0.28 0.09		
12	200	3.33			3.99 50.0	2.55 14.0	1.60 5.5	1.12 2.40	0.78 1.0	0.52 0.40	0.41 0.22	0.32 0.12	0.25 0.065	
15	250	4.17				3.19 21.0	2.01 8.0	1.41 3.70	0.98 1.50	0.66 0.57	0.51 0.34	0.40 0.18	0.31 0.105	0.25 0.06
18	300	5.00				3.82 28.0	2.41 10.5	1.69 4.60	1.18 1.95	0.78 0.77	0.61 0.45	0.48 0.25	0.37 0.13	0.29 0.085
24	400	6.67					3.21 19.0	2.25 8.0	1.57 3.60	1.05 1.40	0.81 0.78	0.65 0.44	0.50 0.23	0.39 0.15
30	500	8.33					4.01 28.0	2.81 11.5	1.96 5.0	1.31 2.0	1.02 1.20	0.81 0.63	0.62 0.33	0.49 0.21
36	600	10.0					4.82 37.0	3.38 15.0	2.35 6.6	1.57 2.60	1.22 1.50	0.97 0.82	0.74 0.45	0.59 0.28
42	700	11.7					5.64 47.0	3.95 24.0	2.75 8.0	1.84 3.50	1.43 1.90	1.13 1.10	0.87 0.60	0.69 0.40
48	800	13.3						4.49 26.0	3.13 11.0	2.09 4.5	1.62 2.60	1.29 1.40	0.99 0.81	0.78 0.48
54	900	15.0						5.07 33.0	3.53 13.5	2.36 5.5	1.83 3.20	1.45 1.70	1.12 0.95	0.08 0.58
60	1000	16.7						5.64 40.0	3.93 16.0	2.63 6.7	2.04 3.90	1.62 2.2	1.24 1.2	0.96 0.75
75	1250	20.8							4.89 25.0	3.27 9.0	2.54 5.0	2.02 3.0	1.55 1.6	1.22 0.95
90	1500	25.0							5.88 33.0	3.93 13.0	3.05 8.0	2.42 4.1	1.86 2.3	1.47 1.40
105	1750	29.2							6.86 44.0	4.59 17.5	3.56 9.7	2.83 5.7	2.17 3.2	1.72 1.9

Quantity of water			PELM/PEH PN 10					
m ³ /h	Litres/min.	Litres/sec.	PELM	PEH				
120	2000	33.3		5.23	4.06	3.23	2.48	1.96
				23.0	13.0	7.0	4.0	2.4
150	2500	41.7		6.55	5.08	4.04	3.10	2.45
				34.0	18.0	10.5	6.0	3.5
180	3000	50.0		7.86	6.1	4.85	3.72	2.94
				45.0	27.0	14.0	7.6	4.4
240	4000	66.7			8.13	6.47	4.96	3.92
					43.0	24.0	13.0	7.5
300	5000	83.3				8.08	6.2	4.89
						33.0	18.0	11.0

The table is based on a nomogram.

Roughness: K = 0.01 mm.

Water temperature: t = 10 °C.

13. Certificates

Grundfos SP offers a number of certificates and reports. For further information and ordering, contact Grundfos.

SP certificates

Product number	Description
96507930	Pump curve test report - Grade 3B
96507896	Test certificate non- specified. Inspection + test
96507897	Inspection certificate internal
96699829	Inspection certificate 3rd party
96507928	Material specification report
96507934	Cleaned and dried pump report
96507895	Certificate of compliance with the order
97549477	Top chamber hydrostatic pressure test

Witness test

Physical witness test

The witness test is not a certificate and will not result in a written statement from Grundfos. The witness test itself is the only guarantee that everything is carried out as prescribed in the testing procedure.

The purpose of the process is to provide a professional support if the customer visits Grundfos in order to physically attend the hydraulic testing of bought pump(s) and authenticate our activities.

Virtual witness test

There is a possibility for a virtual witness test in case the customer is unable to participate in the testing in person.

Note: If a certificate, a test report or a witness test is required, it has to be requested through the CIC system as a service request. Certificates, test reports or witness tests have to be confirmed for every request.

Witness product numbers

Product number	Description
98578602	Physical witness test of SP pumps
92544251	Virtual witness test of SP pumps

ISO 9906:2012 test report

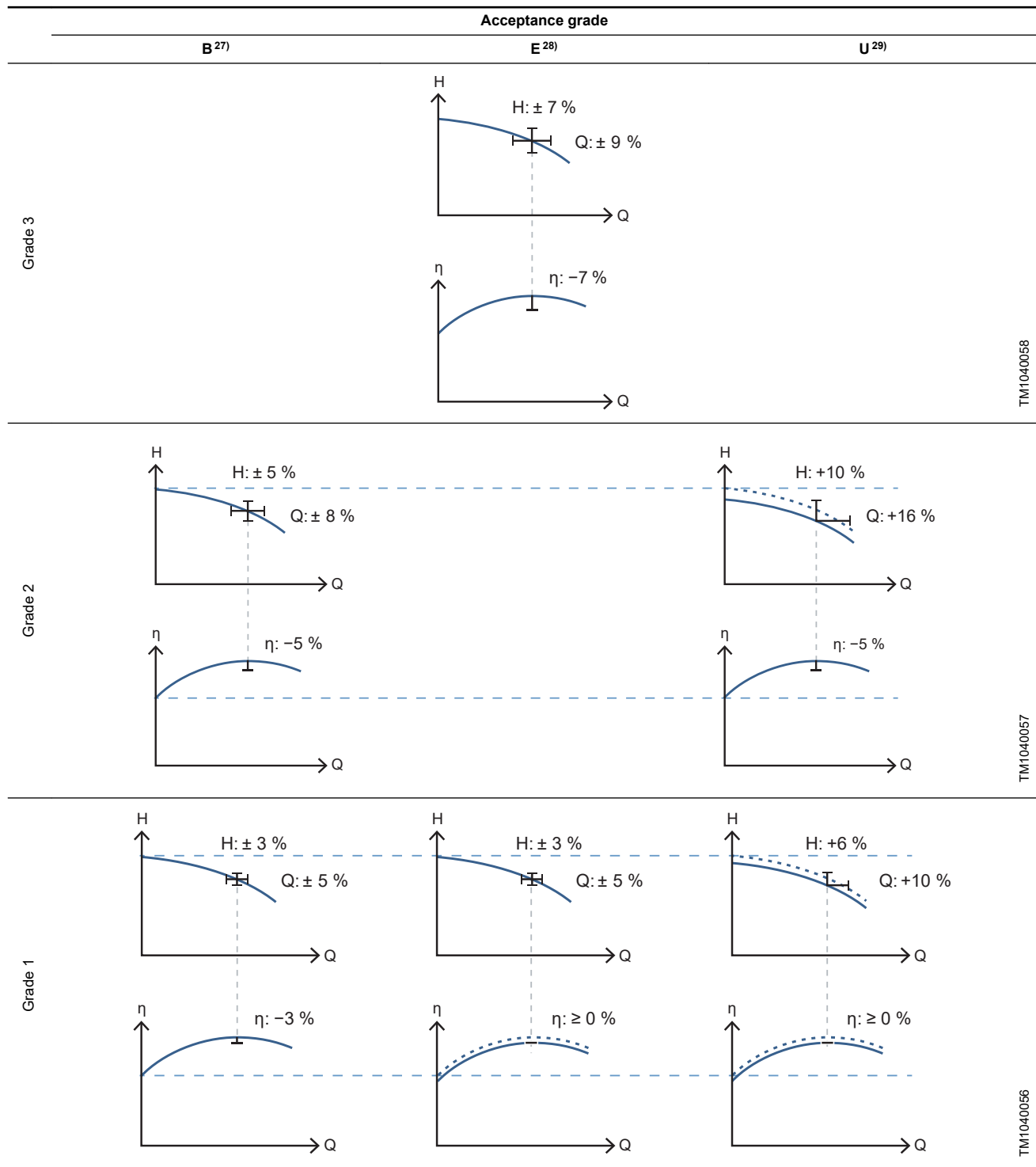
Test reports and certifications for Grundfos pumps from state-of-the-art test facilities.

Test report title
Duty point verification report - Grade 3B, Q&H
Duty point verification report - Grade 3B, Q&H+eta total
Duty point verification report - Grade 3B, Q&H+P1
Duty point verification report - Grade 2B, Q&H
Duty point verification report - Grade 2B, Q&H+eta total
Duty point verification report - Grade 2B, Q&H+P1
Duty point verification report - Grade 2U, Q&H
Duty point verification report - Grade 2U, Q&H+eta total
Duty point verification report - Grade 2U, Q&H+P1
Duty point verification report - Grade 1B, Q&H
Duty point verification report - Grade 1B, Q&H+eta total
Duty point verification report - Grade 1B, Q&H+P1
Duty point verification report - Grade 1E, Q&H
Duty point verification report - Grade 1E, Q&H+eta total
Duty point verification report - Grade 1E, Q&H+P1
Duty point verification report - Grade 1U, Q&H
Duty point verification report - Grade 1U, Q&H+eta total
Duty point verification report - Grade 1U, Q&H+P1

ISO 9906:2012 tolerance factors

	Grade 1			Grade 2		Grade 3	
	1U	1E	1B	2B	2U	3B	
Flow rate [T_Q]	+10 %	± 5 %	± 5 %	± 8 %	± 16 %	± 9 %	Mandatory
Head [T_H]	+6 %	± 3 %	± 3 %	± 5 %	± 10 %	± 7 %	
Efficiency [T_η]	≥ 0 %	≥ 0 %	-3 %	-5 %	-5 %	-7 %	Optional

Acceptance grades and tolerances



²⁷⁾ Acceptance grade B refers to grades with a bilateral tolerance on flow rate and head, and a tolerance on efficiency.

²⁸⁾ Acceptance grade E refers to grades with a bilateral tolerance on flow rate and head, but without a tolerance on efficiency.

²⁹⁾ Acceptance grade U refers to grades with a unilateral tolerance on flow rate and head. For the 1U grade, there is a tolerance on efficiency. For the 1U grade, there is no tolerance on efficiency.

Note: if the acceptance grade changes from Grade 1B to 1U, it does not necessarily mean a better pump with a higher efficiency.

14. Grundfos Product Center

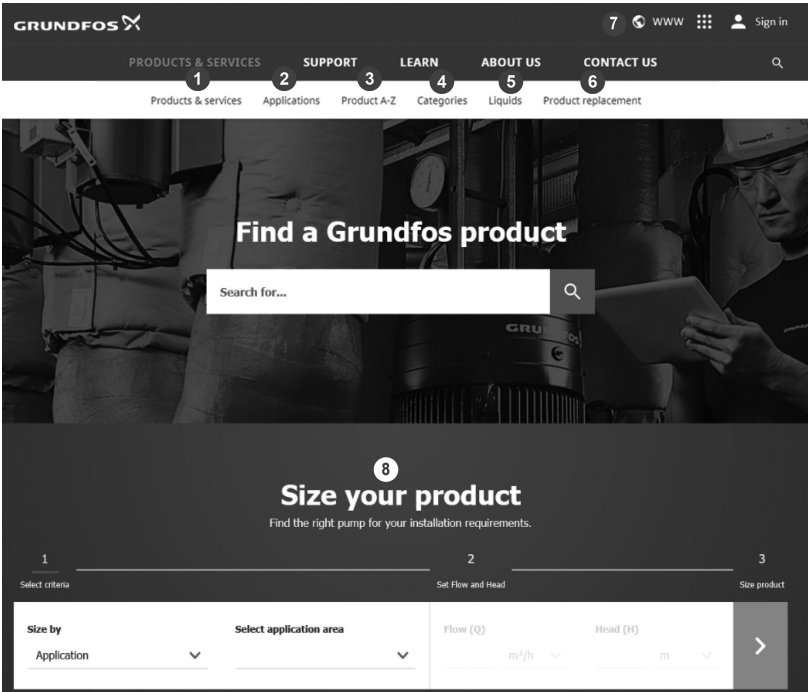
Online search and sizing tool to help you make the right choice.
From the international view, you can select your specific country to view the product range available to you.
International view: <https://product-selection.grundfos.com>

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc., in PDF format.



When you select your country, you will see the menus below. Note that some menus may not be available depending on the country.

Example: <https://product-selection.grundfos.com/uk>

Pos.	Description
1	Products & services enables you to find products and documents by typing a product number or name into the search field.
2	Applications enables you to choose an application to see how Grundfos can help you design and optimise your system.
3	Products A-Z enables you to look through a list of all the Grundfos products.
4	Categories enables you to look for a product category.
5	Liquids enables you to find pumps designed for aggressive, flammable or other special liquids.
6	Product replacement enables you to find a suitable replacement.
7	WWW enables you to select the country, which changes the language, the available product range and the structure of the website.
8	Sizing enables you to size a product based on your application and operating conditions.

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