

Booster Modules BM, BMS and BMSX

When high pressure and high-grade steel is required for industrial pressure boosting.



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GRUNDFOS 

Possibility in every drop

Energy savings and efficient operation

The range of BM and BMS pumps offers many advantages for industrial pressure boosting. These pumps offer a simplified design that ensures energy savings and efficient operation for a range of applications, for example reverse osmosis for desalination and water reuse, and for circulation of liquids in systems working under high static pressure. All BM and BMS pumps are available in high differential pressure (hs) and high inlet pressure (hp) variants.

- High efficiency and energy savings
- Easy maintenance and alignment
- Extreme durability and reliability
- Very small footprint
- Easily integrated in any water treatment system
- Constructed in stainless steel and Super Duplex for critical parts
- Some pumps with built-in non-return valve

In principle, the pumps are maintenance-free, if motors are greased and pumps are rinsed with clean water when not running.

A wide range to meet your industrial pressure boosting requirements

• BM booster pump

A unique and solid construction combined with a reliable and noiseless pump, the BM booster pumps clean and aggressive liquids and trouble-free, can handle an inlet pressure of up to 60 bar (on request), and can be operated with VFD, which also can be supplied by Grundfos.

• BMS booster pump

A complete range designed for applications requiring high differential pressure or high system pressure and in high-grade stainless steel, resulting in up to 120 bar in discharge and 90 bar in inlet pressure. Typical applications are reverse osmosis for desalination and industrial water reuse.

• BMSX booster system

This pump system has a unique design dedicated to seawater and brackish water desalination and consists of a BMS hs pump, a BMS hp pump and an isobaric pressure exchanger with an efficiency of up to 98%, which leads to the lowest possible power consumption per cleaned cubic meter of liquid.

Ideal for demanding applications

The BM, BMS and BMSX pumps and systems are designed for high efficiency, easy installation and commissioning, and to be as maintenance-free as possible. They can be easily integrated into any water treatment system. Applications where these industrial pressure-boosting solutions are used include:

• Desalination

For desalination reverse osmosis systems, where the need is to pump water with a high chloride content. In seawater desalination plants, no matter the system setup, there is a requirement for high grade steel pumps requiring minimum maintenance that can operate 24/7, and this is exactly what the BMS is designed to do. Furthermore, they are designed for the pressure challenges in these systems, where both pumps are with very high differential pressure, and a pump for high system pressure is needed. So, no matter if it is a system setup with an isobaric energy recovery device or a turbocharger system setup, you can get a BMS pump for it.

• Water reuse

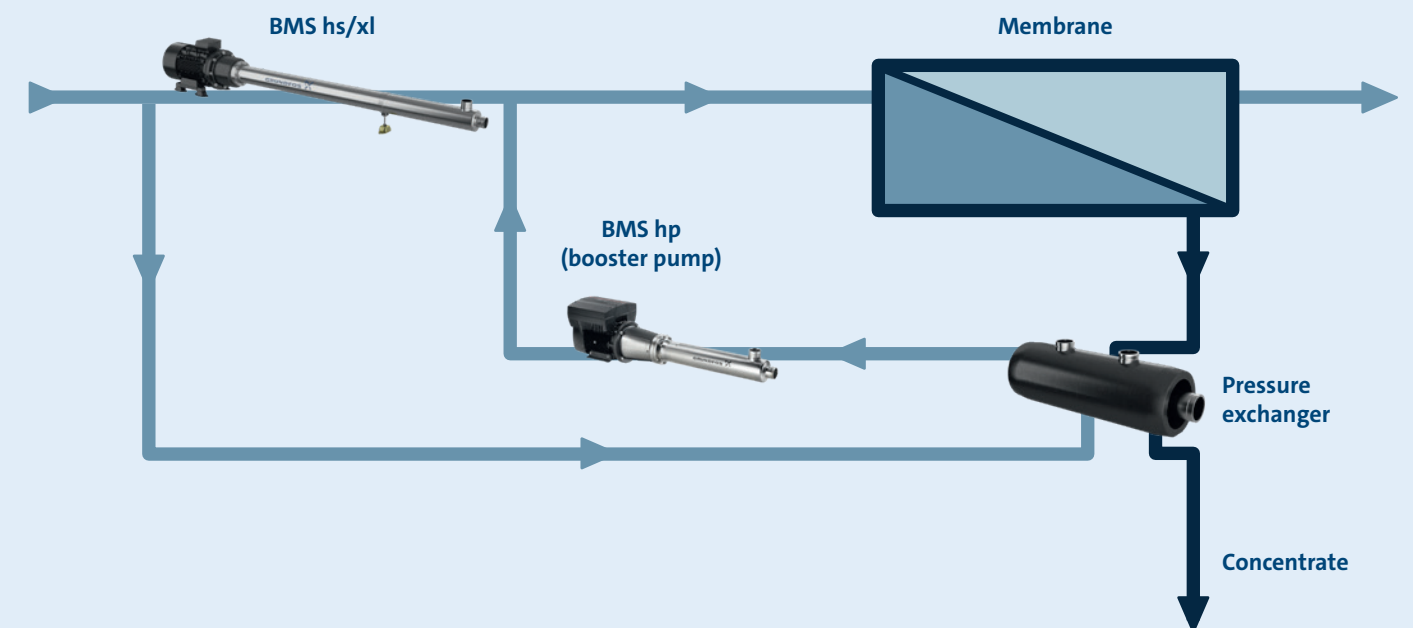
For reverse osmosis systems and nanofiltration, where the need is to reuse process water. Water reuse allows industrial

facilities to save water, reduce costs and meet compliance targets. The BM and BMS boosters, especially in the high-pressure solutions, are designed optimally for this, where the requirements are very similar as for desalination. If you then furthermore bundle it with digital dosing pumps, monitoring, measurement, and control devices you have the perfect package for these systems.

• Industrial pressure boosting

For water supply, circulation of aggressive liquids and demanding applications such as lithium mining, and high-pressure washing systems in industry.

For desalination and water reuse applications in a reverse osmosis installation, we recommend a packaged solution with high differential pressure (hs/xl) and high inlet pressure (hp) booster together with a pressure exchanger, the BMSX system.



Materials chosen for durability

- Duplex and Super Duplex stainless steel; ideal for use in seawater and brackish water applications
- The shaft seal is made from Silicon carbide/Resin impregnated carbon, especially designed for high pressure
- The thrust bearing material is ceramic and carbon
- Pump bearings and seal rings are made of NBR/LSR rubber

Connections

- As standard made with Victaulic coupling but alternatives are possible at request.



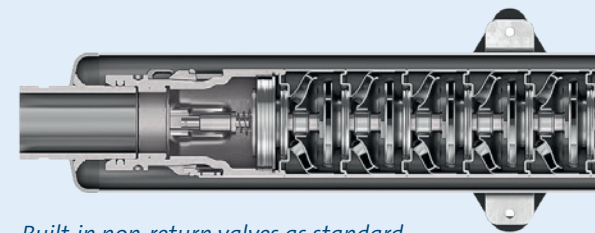
Introducing the BMS range

The BMS range differs from the BM range with flexible motor options for use with a variable frequency converter (VFD), either integrated in the Grundfos MGE motor or as an external Grundfos CUE.

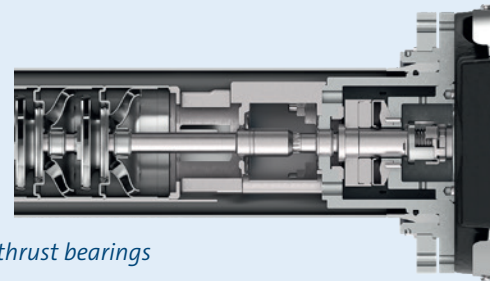
Simplified design and solid construction

- Simplified design for easier access to the shaft seal and thrust bearing for trouble-free maintenance
- The built-in non-return valve is suitable for high pressure and required in combination with many applications
- Built-in thrust bearing so there are no axial forces on the motor shaft and no load on motor bearings; this results in simpler motor construction

The flow through the pump is made so there are as few stagnant areas as possible. And this is the reason we have designed the pump in the chosen materials. Where we have big flow, we use 1.4539 (AISI 904L) but where there is a tendency for water to stagnate, we use a higher-grade steel 1.4410 (SAF 2507).



Built-in non-return valves as standard

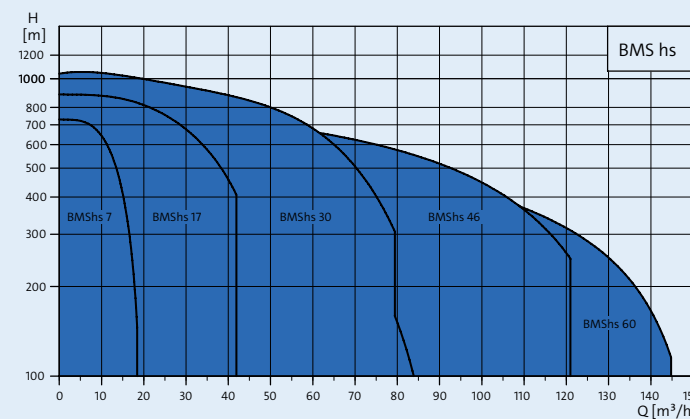


Built-in thrust bearings

BMS hs – high speed pressure boosting

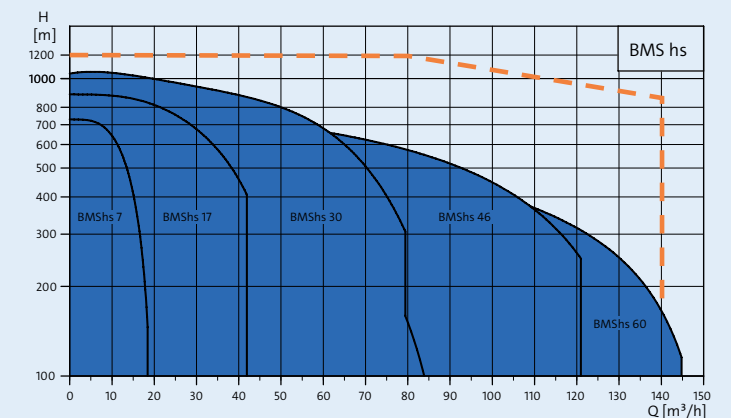
Grundfos BMS hs is a complete range of booster modules for reverse osmosis and other high-pressure applications. The directly coupled pump is powered by a high-speed motor, where the high speed makes a variable frequency drive mandatory. High speed is chosen to reach the needed pressure, and this leads to more compact pumps instead of adding more impellers.

- **Five flow sizes:** 7, 17, 30, 46 and 60
- **Differential pressure:** 0-82.7 bar (max 120 bar discharge)
- **Inlet pressure:** Max 65 bar (BMS 7, 20 bar)
- **Motor range:** 30-180 kW
- **Speed:** 1700-5500 rpm



High pressure solution with two pumps in series
Connect two BMS hs pumps in series for a high-pressure solution.

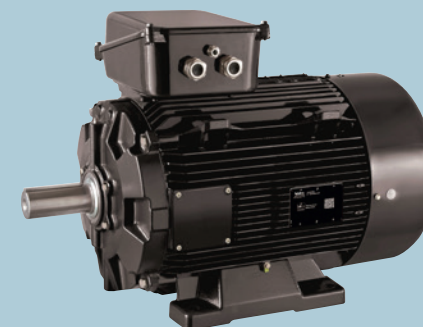
- **Inlet pressure:** Max 65 bar
- **Discharge pressure:** Max 120 bar



Motor options

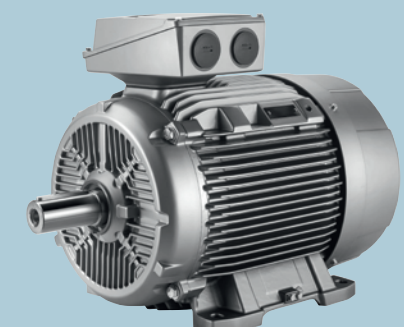
The BMS uses a traditional norm motor, meaning it can be sped up to higher speeds with a VFD. This results in either a higher pressure or a more compact pump, depending on requirements. Available options for pump motors are up to 180 kW with a maximum speed of up to 5500 rpm.

The CUE is included in the package if you buy a BMS hs pump with a PM motor. If a BMS hs pump with a Siemens AC motor is chosen, it is optional for the customer whether they buy a CUE or supply their own VFD.



Nidec PM motor with CUE

- (pre-programmed)
- 44-180 kW
- All BMS hs sizes



Siemens AC motor with any VFD

- 30-180 kW
- All BMS hs sizes

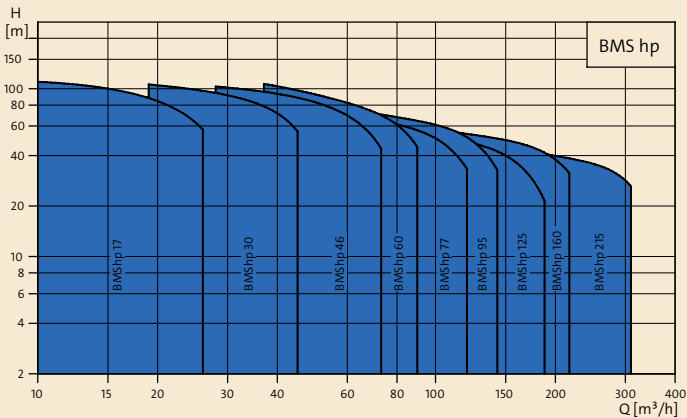
BMS hp – high inlet pressure performance

The BMS hp booster module is suitable for high-pressure industrial and water supply applications. It is capable of increasing system pressure up to 82.7 bar (1200 psi) and can handle an equally high inlet pressure. The BMS hp is the optimal solution for the following:

- Reverse osmosis applications
- Second stage pump for high pressure applications
- Pumps capable of handling high system pressures

The BMS hp can be fitted with a fully enclosed, fan-cooled 2-pole Grundfos MG standard motor or an MGE motor with integrated VFD

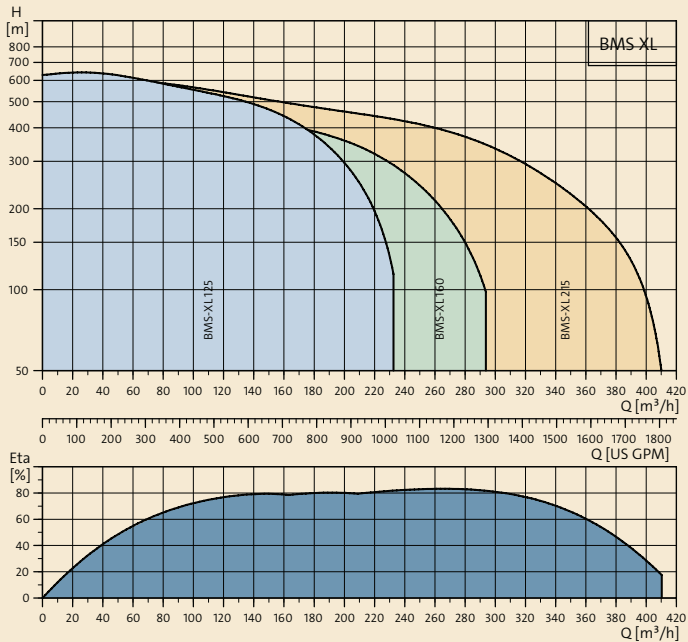
- **Nine flow sizes:** 17, 30, 46, 60, 77, 95, 125, 160 and 215
- **Differential pressure:** 0-12 bar (max 120 bar discharge)
- **Inlet pressure:** Max 82.7 bar (variant max 90 bar)
- **Motor range:** 3-37 kW
- **Speed:** 1700-3600 rpm



BMS xl – for challenging applications requiring high pressure flow up to 400 m³/h

The large BMS xl booster pumps introduce extended flow ranges up to 400 m³/h in three flow sizes while maintaining high pressure. Perfect for applications like industrial water reuse and desalination, the BMS xl helps meet Minimal Liquid Discharge (MLD) and Zero Liquid Discharge (ZLD) strategies.

- **Three flow sizes:** 125, 160 and 215
- **Differential pressure:** 0-60 bar
- **Inlet pressure:** Max 30 bar
- **Motor range:** 160-355 kW
- **Speed:** 1700-3550 rpm



Motor options

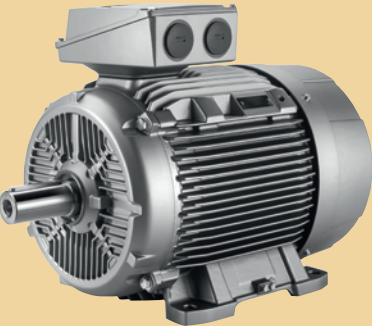
Available options for pump motors up to 37 kW with a maximum speed of up to 3600 rpm.



- Grundfos MGE motor.**
- 3-22 kW
 - All BMS hp sizes



- Grundfos MG motor.**
- 3-22 kW
 - All BMS hp sizes



- Siemens AC motor.**
- 30-37 kW
 - All BMS hp sizes

Increase flow while maintaining high pressure

The BMS xl pumps offer the same high quality build, reliability and variants as the standard BMS range. They are also available as combined systems with a dedicated CUE frequency converter.

- Built in high-grade stainless-steel
- The same high durability and robustness
- Highest efficiency maintained for both the hydraulics and motor
- Uses standard IE4 motors

Motor options

The BMS xl comes with a standard norm IE4 motor with a maximum speed of 3550 rpm.

- Siemens AC motor.**
- 160-355 kW
 - All BMS xl sizes



Size BMS xl on Grundfos Product Center
<https://product-selection.grundfos.com>



BMS installation with variable frequency drive

The BMS (hs/hp/xl) is a directly coupled pump powered by a high-speed motor, where the high speed makes a variable frequency drive mandatory. With a permanent magnet (PM) motor, the Grundfos CUE variable frequency drive is included. If an asynchronous (AC) motor is chosen, a variable frequency drive is still required, and we recommend the Grundfos CUE. If a different brand is preferred, you are free to choose. Add to that an improved design that makes maintenance and service easier than ever, and you have a winning concept.

When you receive your BMS PM with a CUE or any BMS pump with a MGE motor:

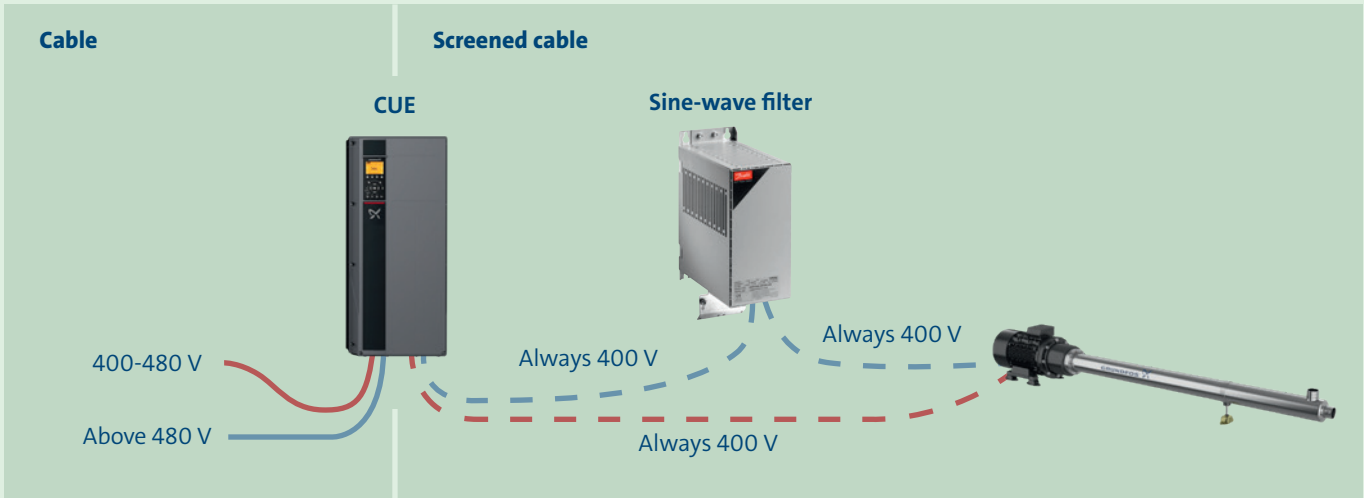
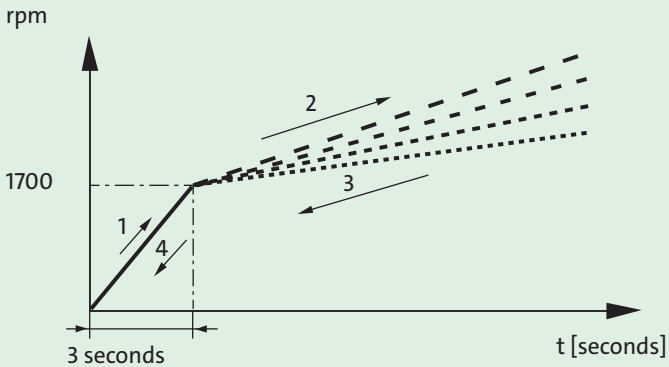
- Motor data are pre-programmed.
- Ramp-up and ramp-down are set
- Set to 'Open Loop' without feedback

'Open Loop' means that when you activate the VFD it will speed up to nominal speed for the pump/motor combination with the pre-programmed ramp times. This can of course be changed if you need to control the speed according to your system.

Available variants

BMS (hs/hp/xl) pumps are highly configurable. If you cannot find specific solution for your application, contact Grundfos. Variants are available with:

- High pressure
- Industrial motor, 690 Volt
- Over- and under-sized motor
- Certificates
- Clean and dried
- Base frame
- Different paint classes
- Higher IP class
- Standstill heating
- Customer specific nameplate
- More on request



BMSX – unbeatable and complete high-efficiency RO package

The Grundfos BMSX pump system is a package consisting of the required high-pressure pumps, booster pumps, energy recovery device, VFDs and sensors for reverse osmosis systems up to 1,500 m³/day. All of this can easily be sized in Grundfos Product Center with basic system information.

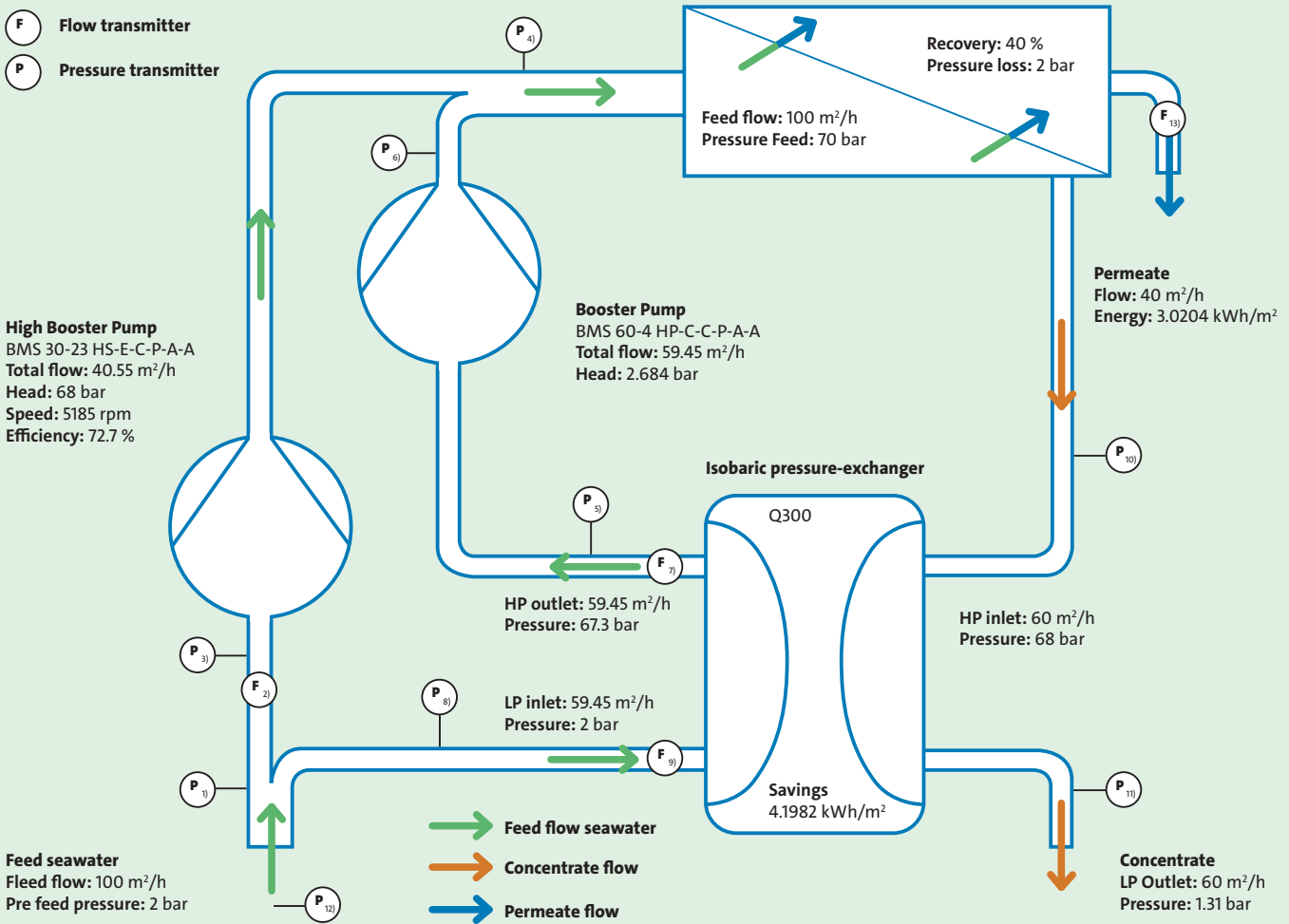
- Capable of up to 1,500m³/day with an energy consumption starting as low as 2 kwh/m³ of produced water
- Features components made of Super Duplex stainless steel, polymer and ceramic, which makes it extremely resistant to its operating environment
- Isobaric pressure exchanger with an efficiency up to 98%
- Super-efficient and highly dependable regardless of the application
- Compact design and a very small footprint

BMSX system configuration

Try the powerful BMSX configuration engine in GPC and get to see our recommended selection showing your potential energy savings. You get to see the installation illustration for the complete bundled solution, including sensors.

Grundfos Product Center:

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



BM/BM hp 50/60 Hz — for industrial boosting

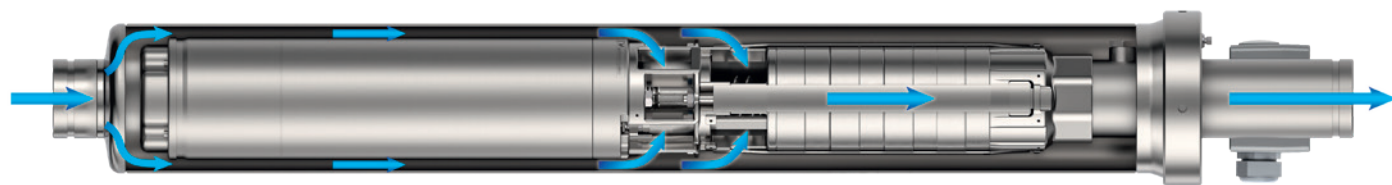
The BM booster offers trouble-free pumping of clean and aggressive liquids and for circulation of liquids in systems working under high static pressure. Grundfos BM booster pumps are available in various high-grade stainless-steel qualities and designs for in-line mounting and high system pressure in a leak-free construction.

- Various steel qualities, 1.4301 (AISI 304), 1.4401 (AISI 316) and 1.4539 (AISI 904L)
- Silent operation, less than db(a) 70
- Modular design, up to 80 bars at a given flow
- Compact design a pipe diameter of 114.3, 168.8 or 273 mm
- Leak-free, no shaft seal

The BM is perfect for desalination and water reuse applications as part of a reverse osmosis system.

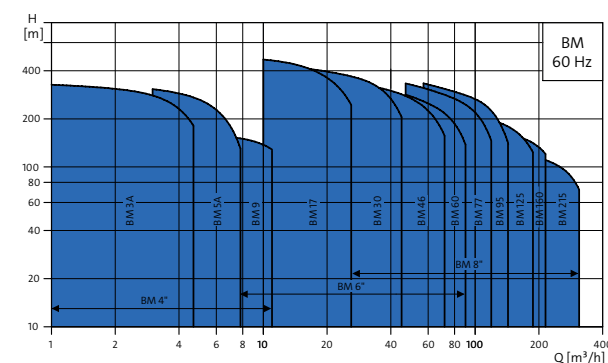
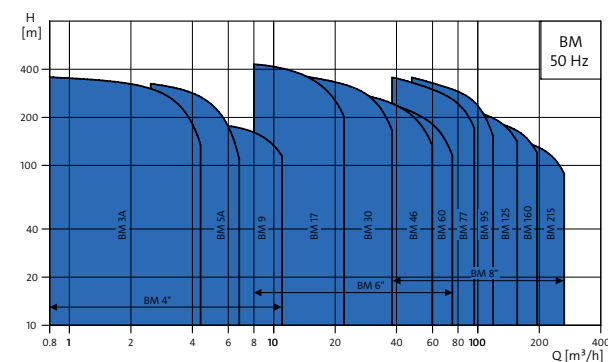
Flow direction through the pump

- Minimum flow velocity > 0.15 m/s



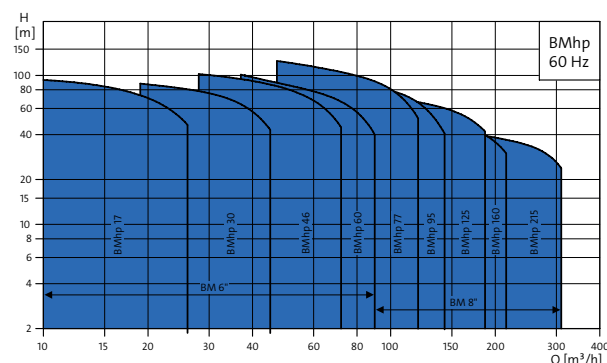
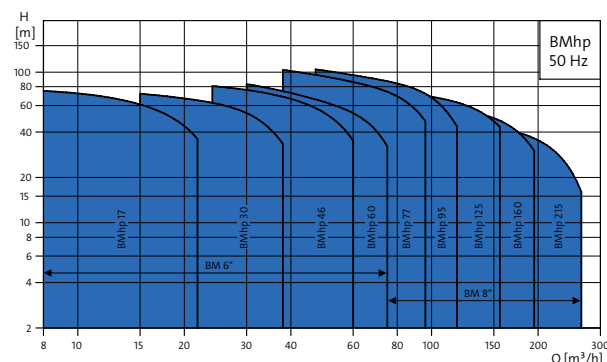
BM

- **Twelve flow sizes:** 3A, 5A, 9, 17, 30, 46, 60, 77, 95, 125, 160 and 215
- **Differential pressure:** 0-40 bar
- **Inlet pressure:** Max 50-60 bar (version dependent)
- **Motor range:** 0.75-92 kW
- **Speed:** 50-60 Hz
- **Liquid temp:** 40 °C



BM hp

- **Nine flow sizes:** 17, 30, 46, 60, 77, 95, 125, 160 and 215
- **Differential pressure:** 0-12 bar
- **Inlet pressure:** Max 82.7 bar (variant max 90 bar)
- **Motor range:** 5.5-30 kW
- **Speed:** 50-60 Hz
- **Liquid temp:** 40 °C



Motor options

The BM uses a submersible motor, which is available in different voltages and temperature classes depending on the demands of the application.

When sizing or ordering your BM booster pump, remember to:

- Size CUE according to motor current not power size; submersible motors typically draw higher current than a standard norm motor
- Size the CUE for 10% higher current than the motor needs, if with a T60 motor this is not required
- If you want thermal protection of the motor, remember to order with PT100 sensors

BM variants and installations

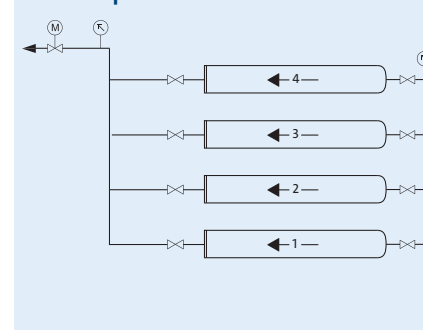
- High pressure
- Industrial motor (T60)
- Over- and under-sized motor
- Certificates
- Clean and dried
- Different materials
- No terminal box
- Customer specific nameplate
- Straight pipe or elbow
- More on request



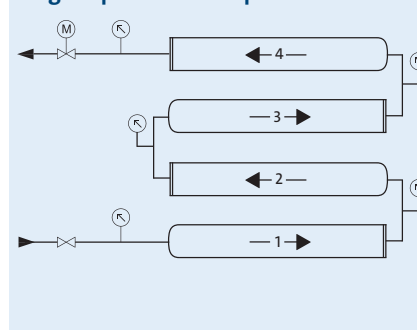
Go to Grundfos Product Center to size the pressure boosting system ideal to your needs
<https://product-selection.grundfos.com/>

Combining BM/BMS pumps for higher flow and/or pressure requirements

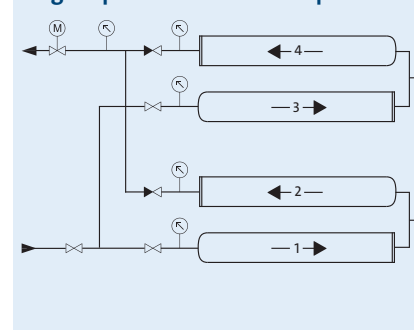
Parallel combination for higher flow requirements



Serial combination when higher pressure is required



Parallel/Serial combination for both higher pressure and flow requirements



BM installation with variable frequency drive. We always recommend using an output filter

