

NB, NBG

Installation and operating instructions



English (GB) Installation and operating instructions

Original installation and operating instructions

CONTENTS

	Page		
1. Symbols used in this document	2	12. Maintenance	28
2. General information	2	12.1 Pump	28
3. Receiving the product	3	12.2 Mechanical shaft seals	28
3.1 Delivery	3	12.3 Motor	28
3.2 Transporting the product	3	12.4 Lubrication	28
3.3 Handling the product	3	13. Periods of inactivity and frost protection	28
3.4 Storing the product	4	14. Service	28
4. Identification	4	14.1 Service kits	28
4.1 Nameplate	4	15. Technical data	28
4.2 Type key	5	15.1 Electrical data	28
5. Applications	8	15.2 Sound pressure level	29
5.1 Pumped liquids	8	16. Fault finding	30
6. Operating conditions	8	17. Disposal	31
6.1 Ambient temperature and altitude	8		
6.2 Liquid temperature	8		
6.3 Max. operating pressure	8		
6.4 Minimum inlet pressure	9		
6.5 Maximum inlet pressure	9		
6.6 Minimum flow rate	9		
6.7 Maximum flow rate	9		
6.8 Shaft seals	10		
7. Mounting of motor on bare shaft pumps	11		
7.1 Mounting of motor on pump housing without feet	11		
7.2 Mounting of motor on pump housing with feet	13		
8. Mechanical installation	15		
8.1 Pump location	15		
8.2 Installation positions	16		
8.3 Foundation of NB, NBG pump without base frame	16		
8.4 Foundation of NB, NBG pump with base frame	17		
8.5 Pipework	20		
8.6 Vibration damping	21		
8.7 Expansion joints	21		
8.8 Measuring instruments	22		
9. Flange forces and torques	23		
10. Electrical connection	25		
10.1 Motor protection	25		
10.2 Frequency converter operation	25		
11. Startup	26		
11.1 General information	26		
11.2 Priming	26		
11.3 Checking the direction of rotation	26		
11.4 Starting up the pump	27		
11.5 Shaft seal run-in period	27		
11.6 Start/stop	27		
11.7 Reference readings of monitoring equipment	27		

Warning

Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.



Warning

If these safety instructions are not observed, it may result in personal injury.

Caution

If these safety instructions are not observed, it may result in malfunction or damage to the equipment.

Note

Notes or instructions that make the job easier and ensure safe operation.

2. General information

NB, NBG are non-self-priming, single stage, centrifugal volute pumps with axial inlet port and radial outlet port.

NB pumps comply with EN 733.

NBG pumps comply with ISO 2858.

3. Receiving the product

3.1 Delivery

The pumps are tested 100 % before leaving the factory. The test includes a function test where the pump performance is measured to ensure that the pump meets the requirements of relevant standards. Test certificates are available from Grundfos.

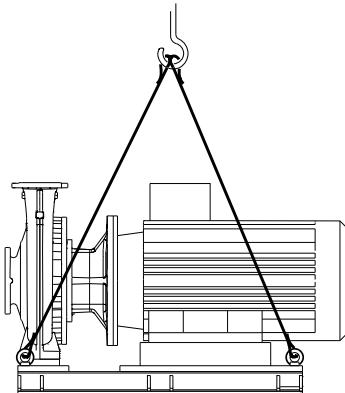
3.2 Transporting the product

Always transport the pump in the specified position. During transport, the pump must be fastened securely to prevent damage to the shaft and shaft seal caused by excessive vibrations and knocks. Do not lift the pump by means of the shaft.



Warning

Pay attention to the pump weight, and take precautions to prevent personal injury if the pump should topple or fall by accident.



TM04 5179 2809

Fig. 2 Correct lifting of pump with base frame

3.3 Handling the product

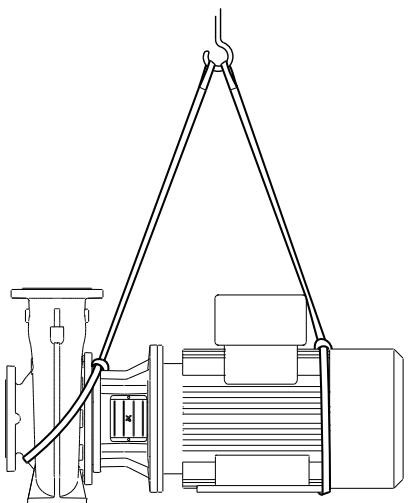
Weight: See label on the packing.



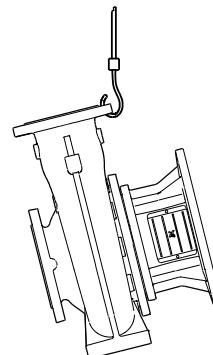
Warning

Motors from 4 kW and up are supplied with lifting eyes which must not be used for lifting the entire pump unit. See fig. 4.

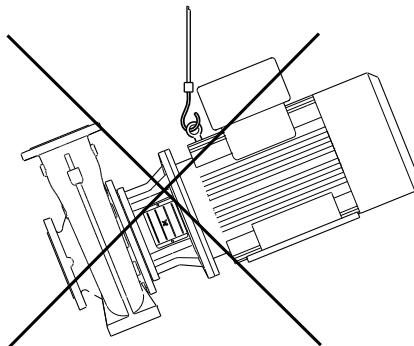
Lift the pumps by means of nylon straps and shackles or a hook as shown on figs 1 to 3.



TM03 3973 1306

Fig. 1 Correct lifting of pump without base frame

TM03 3309 1112

Fig. 3 Correct lifting of pump without motor

TM03 3972 1306

Fig. 4 Incorrect lifting of pump

3.4 Storing the product

The contractor must inspect the equipment on delivery and make sure that it is stored in such a way that corrosion and damage are avoided. If more than six months will pass before the equipment is put into operation, please consider applying a suitable corrosion inhibitor to the internal pump parts.

Make sure that the corrosion inhibitor used does not affect the rubber parts with which it comes into contact.

Make sure that the corrosion inhibitor can easily be removed.

To prevent water, dust, etc. from entering the pump, keep all openings covered until the pipes are to be fitted. The cost of having to dismantle the pump during startup to remove foreign objects can be very high.

4. Identification

4.1 Nameplate

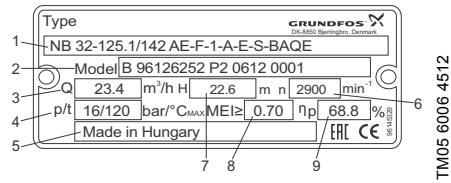


Fig. 5 Example of nameplate for NB

Legend

Pos.	Description
1	Type designation
2	Model
3	Rated flow rate
4	Pressure rating or maximum temperature
5	Country of origin
6	Rated speed
7	Head
8	Minimum efficiency index
9	Hydraulic efficiency at optimum efficiency point

4.2 Type key

Model B

Example 1, pump design according to EN 733	NB	32	-125.1	/142	A E F 1 A E S B A Q E
Example 2, pump design according to ISO 2858	NBG	125-100-160		/160-142	A F 2 N K S D Q Q K
Type range					
Nominal diameter of inlet port (DN)					
Nominal diameter of outlet port (DN)					
Nominal impeller diameter [mm]					
Reduced performance: .1					
Actual impeller diameter [mm]					
Code for pump version; the codes may be combined					
A Basic version					
B Oversize motor					
C Without motor					
D Pump housing with feet					
E With ATEX approval, certificate or test report, the second character of the pump version code is an E					
F Version with base frame					
S With support blocks					
X Special version; used in case of further customisation than already listed					
Pipe connection					
E Table E flange					
F DIN flange					
G ANSI flange					
J JIS flange					
Flange pressure rating (PN - rated pressure)					
1 10 bar					
2 16 bar					
3 25 bar					
4 40 bar					
5 Other pressure rating					
Materials					
Pump housing	Impeller	Wear ring	Shaft		
A EN-GJL-250	EN-GJL-200	Bronze/brass	1.4301		
B EN-GJL-250	Bronze CuSn10	Bronze/brass	1.4301		
C EN-GJL-250	EN-GJL-200	Bronze/brass	1.4401		
D EN-GJL-250	Bronze CuSn10	Bronze/brass	1.4401		
E EN-GJL-250	EN-GJL-200	EN-GJL-250	1.4301		
F EN-GJL-250	Bronze CuSn10	EN-GJL-250	1.4301		
G EN-GJL-250	EN-GJL-200	EN-GJL-250	1.4401		

Example 1, pump design according to EN 733				NB	32 -125 .1 /142 AE F 1 A E S BAQE					
Example 2, pump design according to ISO 2858				NBG	125 -100 -160 /160-142 A F 2 N K S DQQK					
H	EN-GJL-250	Bronze CuSn10	EN-GJL-250	1.4401						
I	1.4408	1.4408	1.4517	1.4462						
J	1.4408	1.4408	Carbon-graphite-filled PTFE (Graflon®)	1.4462						
K	1.4408	1.4408	1.4517	1.4401						
L	1.4517	1.4517	1.4517	1.4462						
M	1.4408	1.4517	1.4517	1.4401						
N	1.4408	1.4408	Carbon-graphite-filled PTFE (Graflon®)	1.4401						
P	1.4408	1.4517	Carbon-graphite-filled PTFE (Graflon®)	1.4401						
R	1.4517	1.4517	Carbon-graphite-filled PTFE (Graflon®)	1.4462						
S	EN-GJL-250	1.4408	Bronze/brass	1.4401						
T	EN-GJL-250	1.4517	Bronze/brass	1.4462						
U	1.4408	1.4517	1.4517	1.4462						
W	1.4408	1.4517	Carbon-graphite-filled PTFE (Graflon®)	1.4462						
X	Special version									
Rubber parts in pump										
Material of O-ring for pump cover										
E	EPDM									
F	FXM (Fluoraz®)									
K	FFKM (Kalrez®)									
M	FEPS (PTFE-sheathed silicone O-ring)									
X	HNBR									
V	FKM (Viton®)									
Shaft seal arrangement										
S	Single seal									
Code for mechanical shaft seal and shaft seal rubber parts										

Example 1 shows an NB 32-125.1 pump with these characteristics:

- reduced performance
- 142 mm impeller
- basic version
- ATEX approval, certificate or test report
- DIN flange to EN 1092-2 pipe connection
- 10 bar flange pressure rating
- cast-iron pump housing, EN-GJL-250
- cast-iron impeller, EN-GJL-200
- bronze/brass wear ring
- stainless-steel shaft, EN 1.4301
- EPDM O-ring for pump cover
- single shaft seal arrangement
- BAQE shaft seal.

4.2.1 Letter codes for shaft seals

Example: 10 = BAQE

B	A	Q	E

Shaft seal type

- A O-ring seal with fixed driver
- B Rubber bellows seal
- D O-ring seal, balanced
- G Bellows seal, type B, with reduced seal faces
- H Cartridge seal, balanced

Material, rotating seal face

- A Carbon, metal-impregnated with antimony which is not approved for potable water
- B Carbon, resin-impregnated
- Q Silicon carbide

Material, stationary seat

- A Carbon, metal-impregnated with antimony which is not approved for potable water
- B Carbon, resin-impregnated
- Q Silicon carbide

Material, secondary seal and other rubber and composite parts, except the wear ring

- E EPDM
- V FKM (Viton®)
- F FXM (Fluoraz®)
- K FFKM (Kalrez®)
- X HNBR
- U Dynamic O-rings in FFKM and static O-rings in PTFE

For a thorough description of shaft seal types and materials, see the English-language data booklet entitled "NB, NBG, NK, NKG, NBE, NBGE, NKE, NKGE - Custom-built pumps according to EN 733 and ISO 2858".

5. Applications

5.1 Pumped liquids

Clean, thin, non-explosive liquids without solid particles or fibres. The pumped liquid must not attack the pump materials chemically.

6. Operating conditions

6.1 Ambient temperature and altitude

The ambient temperature and the installation altitude are important factors for the motor life as they affect the life of the bearings and the insulation system.

If the ambient temperature exceeds the recommended maximum ambient temperature or the installation altitude exceeds the recommended maximum altitude above sea level, see fig. 6, the motor must not be fully loaded due to the low density and consequently low cooling effect of the air. In such cases, it may be necessary to use a motor with a higher output.

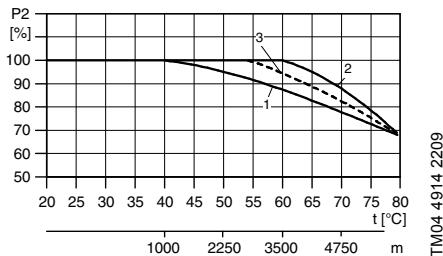


Fig. 6 The maximum motor output depends on the ambient temperature and altitude

Legend

Pos.	Description
1	0.25 - 0.55 kW MG motors
2	0.75 - 22 kW MG motors, IE2/IE3 0.75 - 450 kW MMG-H motors, IE2
3	0.75 - 462 kW Siemens motors, IE2

Example

A pump with a 1.1 kW IE2 MG motor: If this pump is installed 4750 m above sea level, the motor must not be loaded more than 88 % of the rated output. At an ambient temperature of 75 °C, the motor must not be loaded more than 78 % of the rated output. If the pump is installed 4750 m above sea level at an ambient temperature of 75 °C, the motor must not be loaded more than 88 % x 78 % = 68.6 % of the rated output.

6.2 Liquid temperature

-40 - +140 °C.

The maximum liquid temperature is stated on the pump nameplate. It depends on the shaft seal chosen.

For EN-GJL-250 cast-iron pump housings, local regulations may not allow liquid temperatures above +120 °C.

6.3 Max. operating pressure

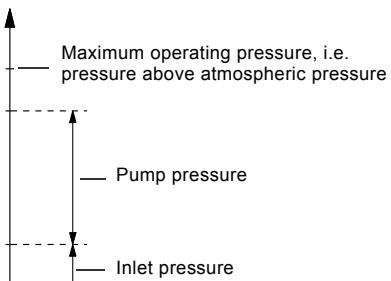


Fig. 7 Pressures in the pump

The inlet pressure + the pump pressure must be lower than the maximum operating pressure stated on the pump nameplate. Operation against a closed valve gives the highest operating pressure.

6.4 Minimum inlet pressure

Pay attention to the minimum inlet pressure to avoid cavitation. The risk of cavitation is higher in the following situations:

- The liquid temperature is high.
- The flow rate is considerably higher than the pump's rated flow rate.
- The pump is operating in an open system with suction lift.
- The liquid is sucked through long pipes.
- The inlet conditions are poor.
- The operating pressure is low.

6.5 Maximum inlet pressure

The inlet pressure + the pump pressure must be lower than the maximum operating pressure stated on the pump nameplate. Operation against a closed valve gives the highest operating pressure.

6.6 Minimum flow rate

The pump must not run against a closed valve as this will cause an increase in temperature/formation of steam in the pump. This may cause shaft damage, impeller erosion, short life of bearings and damage to stuffing boxes or mechanical shaft seals due to stress or vibration. The continuous flow rate must be at least 10 % of the rated flow rate. The rated flow rate is stated on the pump nameplate.

6.7 Maximum flow rate

Do not exceed the maximum flow rate as otherwise there is a risk of for instance cavitation and overload. The minimum and maximum flow rates can be read either from the performance curve pages in the relevant data booklets or from a curve for a specific pump when selecting it in Grundfos Product Center. See www.grundfos.com.

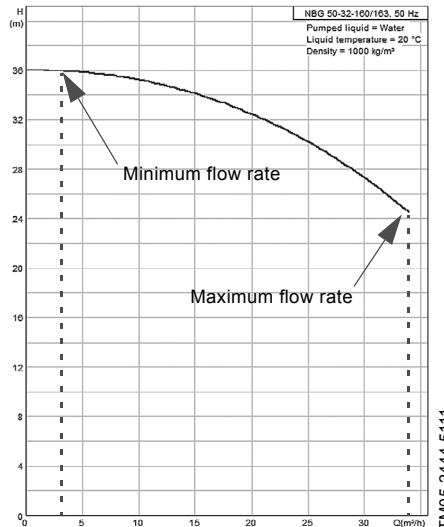


Fig. 8 Example from Grundfos Product Center in www.grundfos.com showing minimum and maximum flow rate

6.8 Shaft seals

The operating range of the seals is described for two main applications: Pumping of water or pumping of coolants.

Seals with a temperature range of 0 °C and up are mainly used for pumping water, while seals for temperatures below 0 °C are mainly intended for coolants.

We do not recommend that you operate the pump at maximum temperature and maximum pressure at the same time as the seal life will be reduced and periodic noise will occur.

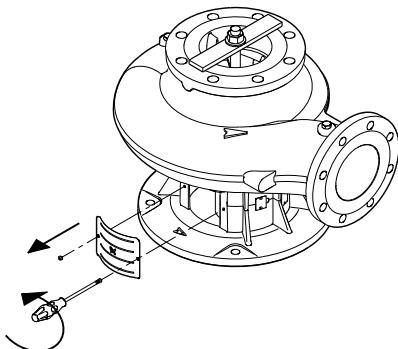
Note

Shaft seal diameter [mm]	28	38	48	55	60
Shaft seal type	Seal faces	Rubber	Code	Temperature range	Max. pressure [bar]
Bellows seal, type B, unbalanced	AQ ₁	EPDM	BAQE	0-120 °C	16 16 16 16
	AQ ₁	FKM	BAQV	0-90 °C	16 16 16 16
	BQ ₁	EPDM	BBQE	0-120 °C	16 16 16 16
	BQ ₁	FKM	BBQV	0-90 °C	16 16 16 16
	Q ₁ B	EPDM	BQBE	0-100 °C	16 - - -
	Q ₇ Q ₇	EPDM	BQQE	-25 - +120 °C	16 16 16 16
	Q ₇ Q ₇	FKM	BQQV	-10 - +90 °C	16 16 16 16
Bellow seal, type B, unbalanced with reduced seal faces	Q ₁ Q ₁	EPDM	GQQE	-25 - +60 °C	16 16 16 16
	Q ₁ Q ₁	FKM	GQQV	-10 - +60 °C	16 16 16 16
	Q ₁ A	EPDM	AQAE	0-120 °C	16 16 16 16
	Q ₁ A	FKM	AQAV	0-90 °C	16 16 16 16
O-ring seal, type A, unbalanced	Q ₁ Q ₁	EPDM	AQQE	-25 - +90 °C	16 16 16 16
	Q ₁ Q ₁	FKM	AQQV	-10 - +90 °C	16 16 16 16
	Q ₁ Q ₁	HNBR	AQQX	-15 - +90 °C	16 16 16 16
	Q ₁ Q ₁	FFKM	AQQK	0-90 °C	16 16 16 16
	AQ ₁	FXM	DAQF	0-140 °C	25 25 25 25
	Q ₆ Q ₆	EPDM	DQQE	-20 - +120 °C	25 25 25 25
	Q ₆ Q ₆	FKM	DQQV	-10 - +90 °C	25 25 25 25
O-ring seal, type D, balanced	Q ₆ Q ₆	HNBR	DQQX	-15 - +120 °C	25 25 25 25
	Q ₆ Q ₆	FFKM	DQQK	0-120 °C	25 25 25 25

7. Mounting of motor on bare shaft pumps

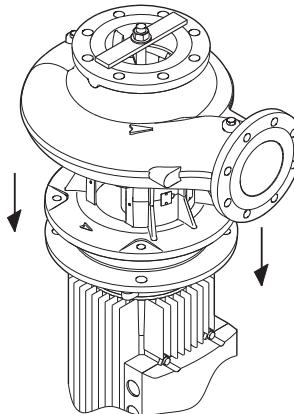
7.1 Mounting of motor on pump housing without feet

The pumps are supplied with a transport bracket protecting the shaft seal during transport. When you mount the motor, follow the instructions shown in these drawings.



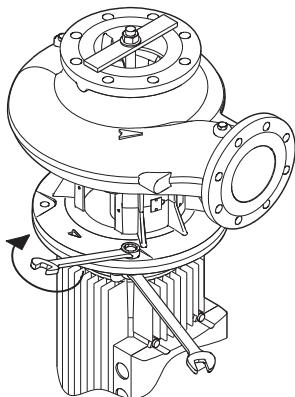
1. Remove the coupling guard and loosen the set screws in the shaft.

TM05 3327 1212



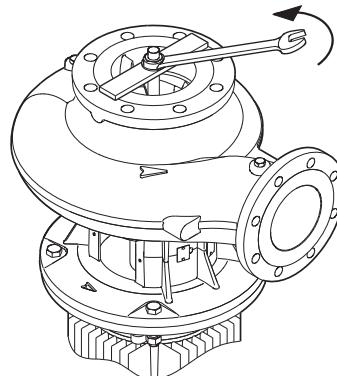
2. Place the pump on the motor.

TM03 3906 1212



3. Fit and tighten the motor screws to the correct torque. See below.

TM03 3907 1212



4. Remove the nut, washer and transport bracket.

TM03 3908 1212

M8: 12 ± 2.4 Nm

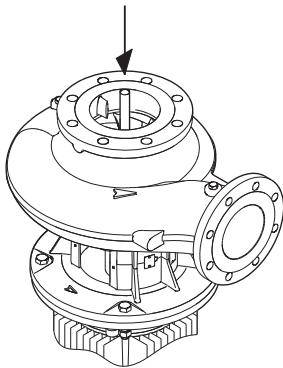
M10: 25 ± 5 Nm

M12: 40 ± 8 Nm

M16: 100 ± 20 Nm

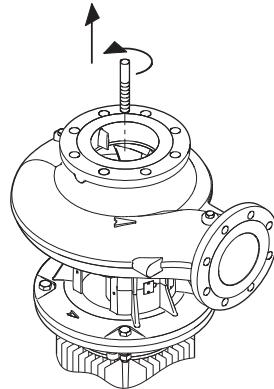
M20: 150 ± 30 Nm

M24: 200 ± 40 Nm



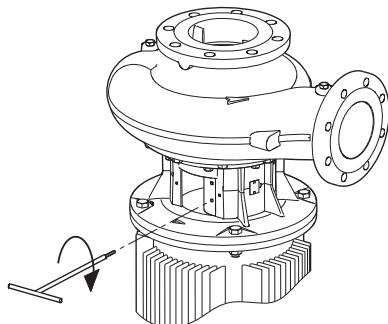
5. Press down the threaded pipe to ensure that the shaft is in bottom position.

TM03 3909 1212



6. Remove the threaded pipe.

TM03 3910 1212



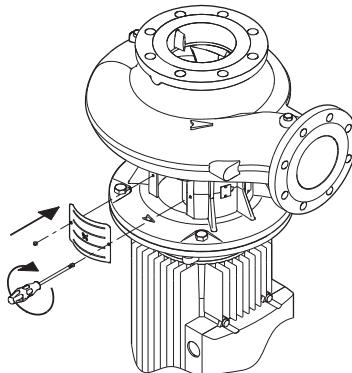
TM03 3911 1212

7. Apply Loctite 243 to the threads of the set screws. Tighten the set screws to the correct torque. See below.

M5: 6 ± 2 Nm

M6: 8 ± 2 Nm

M8: 15 ± 3 Nm



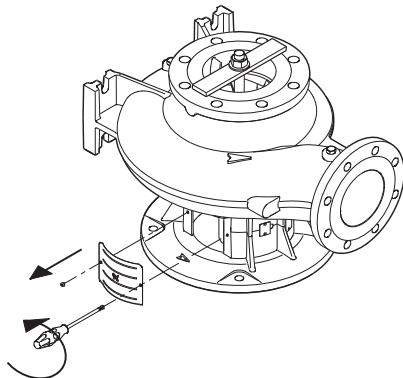
8. Fit the coupling guard. Tighten the screws to the correct torque. See below.

M5 x 10 mm: 6 ± 2 Nm

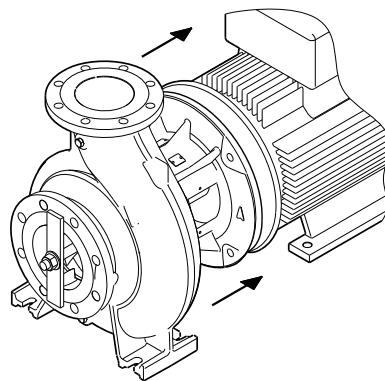
TM03 3912 1212

7.2 Mounting of motor on pump housing with feet

The pumps are supplied with a transport bracket protecting the shaft seal during transport. When you mount the motor, follow the instructions shown in these drawings.

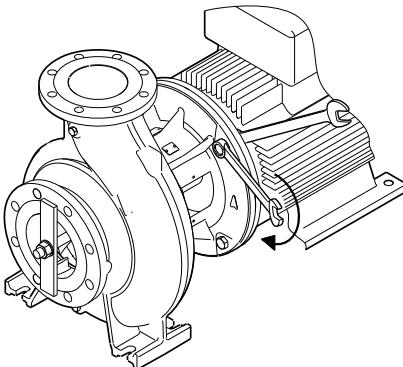


TM03 3913 1206



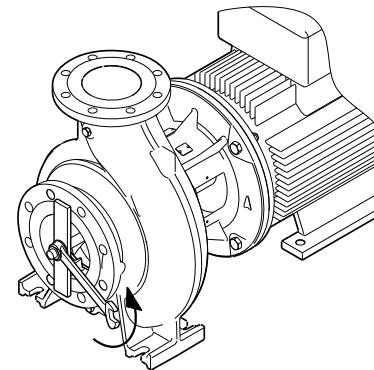
TM03 3905 1206

1. Remove the coupling guard and loosen the set screws in the shaft.



TM03 3914 1206

2. Place the pump at the end of the motor and push the parts together.



TM03 3915 1206

3. Fit and tighten the motor screws to the correct torque. See below.

M8: 12 ± 2.4 Nm

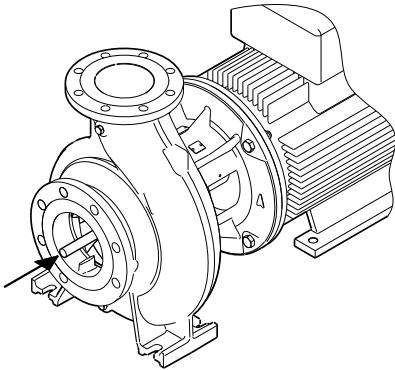
M10: 25 ± 5 Nm

M12: 40 ± 8 Nm

M16: 100 ± 20 Nm

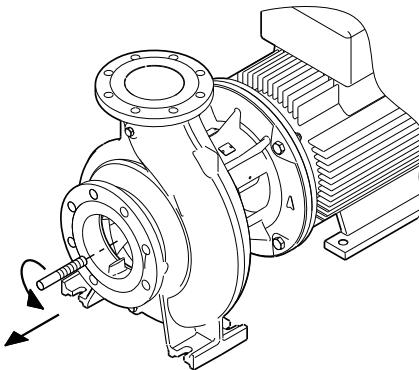
M20: 150 ± 30 Nm

M24: 200 ± 40 Nm



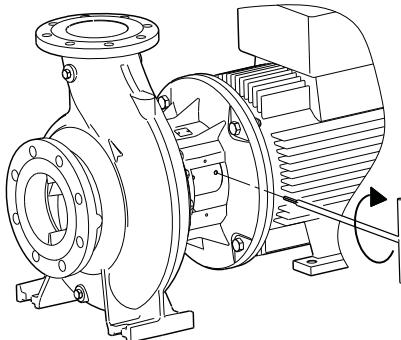
5. Press down the threaded pipe to ensure that the shaft is in bottom position.

TM03 3916 1206



6. Remove the threaded pipe.

TM03 3917 1206



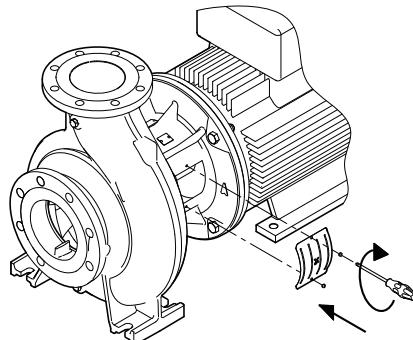
TM03 3918 1206

7. Apply Loctite 243 to the threads of the set screws. Tighten the set screws to the correct torque. See below.

M5: 6 ± 2 Nm

M6: 8 ± 2 Nm

M8: 15 ± 3 Nm



TM03 3919 1206

8. Fit the coupling guard. Tighten the screws to the correct torque. See below.

M5 x 10 mm: 6 ± 2 Nm

8. Mechanical installation

8.1 Pump location

The pump must be sited in a well-ventilated, but frost-free location.

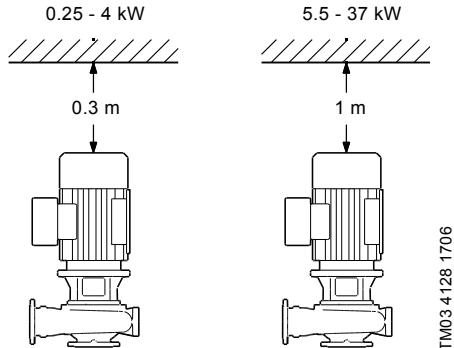
Warning

 When pumping hot or cold liquids, take care to ensure that persons cannot accidentally come into contact with hot or cold surfaces.

For inspection and repair, allow suitable clearances for pump or motor removal.

Vertical installation

- Pumps fitted with motors up to and including 4 kW require a 0.3 m clearance above the motor.
- Pumps fitted with motors of 5.5 kW and up require at least a 1 m clearance above the motor to allow the use of lifting equipment.



TM03 4128 1706

Fig. 9 Clearance above the motor

Horizontal installation

- Pumps fitted with motors up to and including 4 kW require a 0.3 m clearance behind the motor.
- Pumps fitted with motors of 5.5 kW and up require a 0.3 m clearance behind the motor and at least a 1 m clearance above the motor to allow the use of lifting equipment.
- NB pumps with base frame must have the same clearance as pumps with motors from 5.5 to 200 kW.

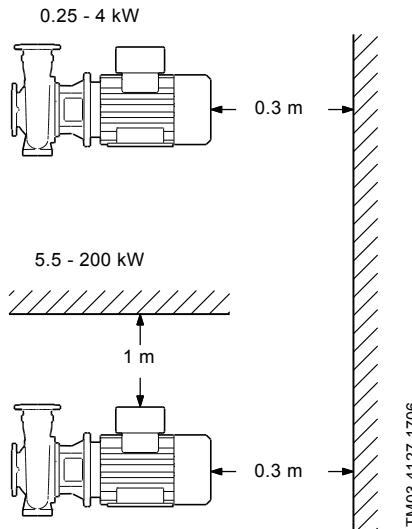


Fig. 10 Clearance behind the motor

TM03 4127 1706

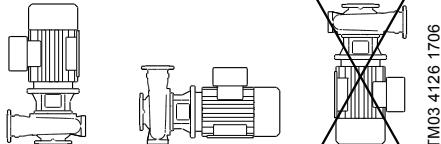
8.2 Installation positions

Arrows on the pump housing show the direction of flow of liquid through the pump.

The pumps can be installed with the motor/pump shaft in all positions between vertical and horizontal, but the motor must never fall below the horizontal plane.

Horizontal motors with feet must always be supported.

0.25 - 37 kW 0.25 - 200 kW



TM03 4126 1706

Fig. 11 Installation positions

Fit isolating valves on either side of the pump as this makes it unnecessary to drain the system if the pump needs to be cleaned or repaired.

8.3 Foundation of NB, NBG pump without base frame

Carry out the foundation/installation in accordance with the following instructions.

Caution

Non-compliance may result in functional faults which will damage the pump components.

We recommend that you install the pump on a plane and rigid concrete foundation which is heavy enough to provide permanent support for the entire pump. The foundation must be capable of absorbing any vibration, normal strain or shock. As a rule of thumb, the weight of the concrete foundation must be at least 1.5 times the weight of the pump. The concrete foundation must have an absolutely level and even surface.

Place the pump on the foundation, and fasten it. See fig. 12.

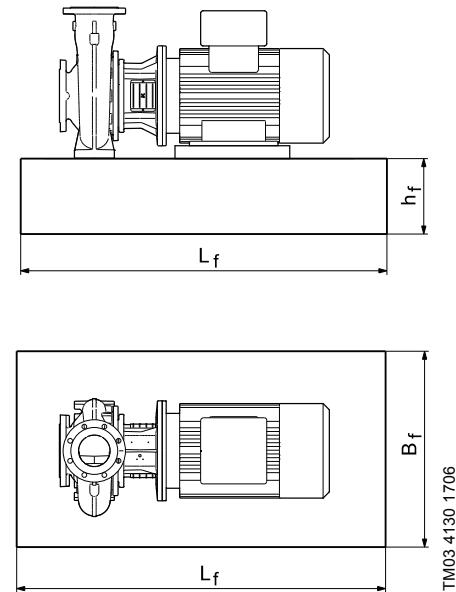


Fig. 12 Foundation

The foundation length and width must always be 200 mm larger than the length and width of the pump. See fig. 12.

The minimum height of the foundation, h_f , can then be calculated:

$$h_f = \frac{m_{\text{pump}} \times 1.5}{L_f \times B_f \times \delta_{\text{concrete}}}$$

The density, δ , of concrete is usually taken as 2,200 kg/m³.

In installations where noise-less operation is particularly important, we recommend a foundation with a mass up to 5 times that of the pump. See also [8.6 Vibration damping](#) on page 21.

8.4 Foundation of NB, NBG pump with base frame

Note This section applies only to 50 Hz pumps as base frames are not supplied for 60 Hz pumps.

We recommend that you install the pump on a plane and rigid concrete foundation which is heavy enough to provide permanent support for the entire pump. The foundation must be capable of absorbing any vibration, normal strain or shock. As a rule of thumb, the weight of the concrete foundation must be 1.5 times the weight of the pump.

The foundation must be 100 mm larger than the base frame on all four sides. See fig. 13.

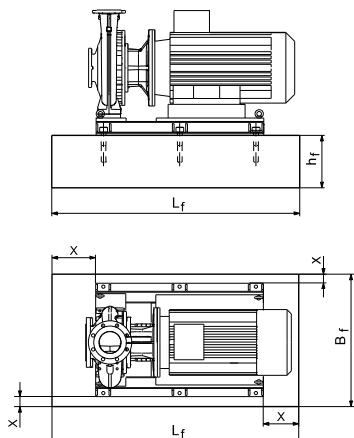


Fig. 13 Foundation, $X = \text{min. } 100 \text{ mm}$

The minimum height of the foundation, h_f , can then be calculated:

$$h_f = \frac{m_{\text{pump}} \times 1.5}{L_f \times B_f \times \delta_{\text{concrete}}}$$

The density, δ , of concrete is usually taken as 2,200 kg/m³.

Place the pump on the foundation, and fasten it. The base frame must be supported under its entire area. See fig. 14.

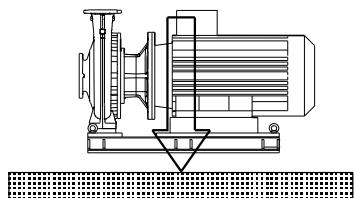


Fig. 14 Correct foundation

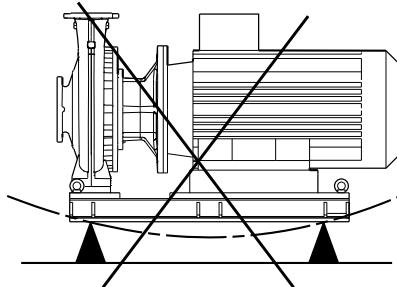


Fig. 15 Incorrect foundation

TM05 1558 2709

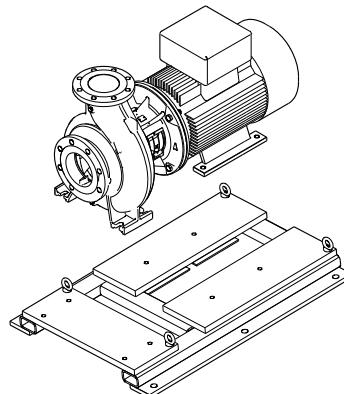


Fig. 16 Base frame with pouring holes

TM05 1561 2709

It is important to prepare a good foundation prior to the installation of the pump.

NB, NBG pumps with base frame are always prepared for grouting. Grouting anchors are welded to the base frame.

For NB, NBG pumps with 2-pole motors equal to or bigger than 55 kW, grouting of the base frame is mandatory in order to prevent vibration energy from the rotating motor and liquid flow to evolve.

Poles	P2 lower than or equal to 45 kW	P2 equal to or higher than 55 kW
2-pole	Grouting optional	Grouting mandatory
4-pole		Grouting optional
6-pole		Grouting optional

Procedure

1. Preparing the foundation
2. Levelling of the base frame
3. Grouting.

TM05 1559 2709

1: Preparing the foundation

We recommend the following procedure to ensure a good foundation.

Step	Action	Illustration
1	<p>Use an approved, non-shrinking concrete. Contact your concrete supplier for advice if any doubts.</p> <p>Pour the foundation without interruptions to within 19-32 mm of the final level. Use vibrators to ensure that the concrete is evenly distributed. The top surface must be well scored and grooved before the concrete sets. This provides a bonding surface for the grout.</p>	
2	<p>Embed foundation bolts in the concrete. Allow enough bolt length to reach through grout, shims, lower part of base frame, nuts and washers.</p>	
3	<p>Let the foundation cure for several days before levelling and grouting the base frame.</p>	

2: Levelling of the base frame

Step	Action	Illustration
1	<p>Lift/jack up the base frame to the final level 19-32 mm above the concrete foundation, and support the base frame by means of blocks and shims both at the foundation bolts and midway between bolts.</p>	
2	<p>Level the base frame by adding or removing shims under the base frame.</p>	
3	<p>Tighten the foundation bolt nuts against the base frame. Make sure the piping can be aligned to the pump flanges without putting strain on pipes or flanges.</p>	

3: Grouting

Grouting compensates for an uneven foundation, distributes the weight of the unit, dampens vibrations and prevents shifting. Use an approved, non-shrinking grout. If you have questions or doubts about the grouting, please contact an expert on grouting.

Step	Action	Illustration
1	<p>Embed reinforcing steel bars into the foundation by means of 2K anchor adhesive glue.</p> <p>The number of steel bars depends on the size of the base frame, but we recommend that you distribute a minimum of 20 bars evenly over the whole area of the base frame.</p> <p>The free end of the steel bar must be $2/3 \times h$ the height of the base frame to ensure a proper grouting.</p>	<p>Minimum 20 bars</p>
2	Soak top of concrete foundation thoroughly, then remove surface water.	
3	Ensure proper shutting at both ends of the base frame.	<p>Shuttering</p>
4	<p>If necessary, check the levelling of the base frame again before grouting. Pour non-shrinking grout through the openings of the base frame until the space underneath the base frame has been filled completely.</p> <p>Fill the formwork with grout up to the base frame top level.</p> <p>Allow the grout to dry thoroughly before attaching piping to the pump. 24 hours is sufficient time with approved grouting procedure.</p> <p>When the grout has thoroughly hardened, check the foundation bolt nuts, and tighten, if necessary.</p> <p>Approximately two weeks after pouring the grout, or when the grout has thoroughly dried, apply an oil-based paint to the exposed edges of the grout to prevent the grout from getting into contact with air and moisture.</p>	

TM04 0490 0708 - TM04 0491 0708

TM05 1562 3011

TM03 2946 4707

8.5 Pipework

8.5.1 Piping

When installing the pipes, make sure that the pump housing is not stressed by the pipes.

The inlet and outlet pipes must be of an adequate size, taking the pump inlet pressure into account. Install the pipes so that air locks are avoided, especially on the inlet side of the pump.

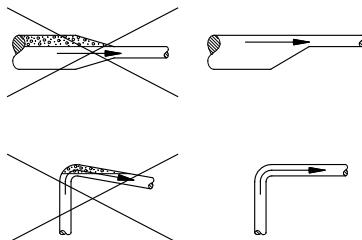


Fig. 17 Pipelines

Fit isolating valves on either side of the pump to avoid having to drain the system if the pump needs to be cleaned or repaired.

Make sure the pipes are adequately supported as close to the pump as possible, both on the inlet and the outlet side. The counter-flanges must lie true against the pump flanges without being stressed as stress would cause damage to the pump.

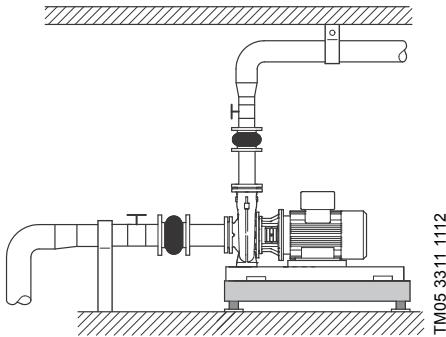
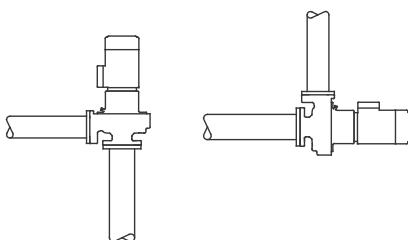


Fig. 18 NB, NBG pump installation

8.5.2 Direct mounting in pipes

Pumps fitted with motors up to and including frame size 132 are suitable for direct mounting in supported pipes.



TM05 3337 1212

Fig. 19 Direct mounting in pipes

This type of installation does not allow the use of expansion joints.

Note To ensure quiet operation, suspend the pipes from suitable pipe hangers.

8.5.3 Bypass

Warning

The pump must not run against a closed valve as this will cause an increase in temperature/formation of steam in the pump which may cause damage to the pump.

If there is any danger of the pump running against a closed valve, ensure a minimum liquid flow through the pump by connecting a bypass or drain to the outlet pipe. The minimum flow rate must be at least 10 % of the maximum flow rate. The flow rate and head are stated on the pump nameplate.

8.6 Vibration damping

8.6.1 Elimination of noise and vibrations

In order to achieve optimum operation and minimum noise and vibration, consider vibration damping of the pump. Generally, always consider this for pumps with motors of 11 kW and up. Vibration damping is mandatory for motors of 90 kW and up. Smaller motor sizes, however, may also cause undesirable noise and vibration.

Noise and vibration are generated by the revolutions of the motor and pump and by the flow in pipes and fittings. The effect on the environment is subjective and depends on correct installation and the state of the rest of the system.

Elimination of noise and vibrations is best achieved by means of a concrete foundation, vibration dampers and expansion joints. See fig. 18.

8.6.2 Vibration dampers

To prevent the transmission of vibrations to buildings, we recommend that you isolate the pump foundation from building parts by means of vibration dampers.

The selection of the right vibration damper requires the following data:

- forces transmitted through the damper
- motor speed, taking speed control, if any, into consideration
- required damping in % - suggested value is 70 %.

The selection of vibration damper will differ from installation to installation. In certain cases, a wrong damper may increase the vibration level. Vibration dampers must therefore be sized by the supplier of the vibration dampers.

If you install the pump on a foundation with vibration dampers, always fit expansion joints on the pump flanges. This is important to prevent the pump from "hanging" in the flanges.

8.7 Expansion joints

Expansion joints provide these advantages:

- absorption of thermal expansion and contraction of pipes caused by variations in liquid temperature
- reduction of mechanical influences in connection with pressure surges in the pipes
- isolation of structure-borne noise in the pipes; this applies only to rubber bellows expansion joints.

Do not install expansion joints to make up for inaccuracies in the pipes, such as centre displacement or misalignment of flanges.

Fit the expansion joints at a minimum distance of 1 to 1 1/2 pipe diameters away from the pump on the inlet and the outlet side. This prevents turbulence in the expansion joints, thus ensuring optimum inlet conditions and minimum pressure loss on the outlet side. At flow velocities greater than 5 m/s, we recommend that you fit larger expansion joints matching the pipes.

Figures 20 and 21 show examples of rubber bellows expansion joints with or without limiting rods.



TM02 4979 1902

Fig. 20 Rubber bellows expansion joint with limiting rods



Fig. 21 Rubber bellows expansion joint without limiting rods

Use expansion joints with limiting rods to reduce the effects of the expansion or contraction forces on the pipes. We always recommend that you use expansion joints with limiting rods for flanges larger than DN 100.

Anchor the pipes in such a way that they do not stress the expansion joints and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

Figure 22 shows an example of a metal bellows expansion joint with limiting rods.

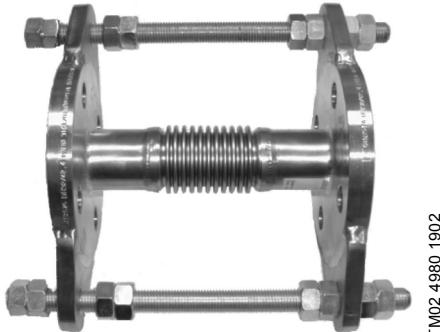


Fig. 22 Metal bellows expansion joint with limiting rods

Due to the risk of rupture of the rubber bellows, we recommend that you use metal bellows expansion joints at temperatures above +100 °C combined with high pressure.

8.8 Measuring instruments

8.8.1 Pressure gauge and mano-vacuum gauge

To ensure continuous monitoring of the operation, we recommend that you install a pressure gauge on the outlet side and a mano-vacuum gauge on the inlet side. Open the pressure gauge tappings only for test purposes. The measuring range of the gauges must be 20 % above the maximum pump pressure.

When measuring with pressure gauge on the pump flanges, note that a pressure gauge does not register dynamic pressure. On all NB, NBG pumps, the diameters of the inlet and outlet flanges are different which results in different flow velocities at the two flanges. Consequently, the pressure gauge on the outlet flange will not show the pressure stated in the technical documentation, but a value which may be up to 1.5 bar or approx. 15 m lower.

8.8.2 Ammeter

To check the motor load, we recommend that you connect an ammeter.

9. Flange forces and torques

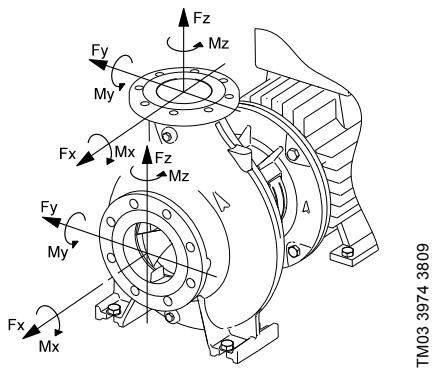


Fig. 23 Flange forces and torques

Grey cast iron	Diameter DN	Force [N]				Torque [Nm]			
		Fy	Fz	Fx	ΣF^*	My	Mz	Mx	ΣM^*
Horizontal pump, z-axis, outlet port	32	298	368	315	578	263	298	385	560
	40	350	438	385	683	315	368	455	665
	50	473	578	525	910	350	403	490	718
	65	595	735	648	1155	385	420	525	770
	80	718	875	788	1383	403	455	560	823
	100	945	1173	1050	1838	438	508	613	910
	125	1120	1383	1243	2170	525	665	735	1068
	150	1418	1750	1575	2748	613	718	875	1278
	200	2600	2100	2095	4055	805	928	1138	1680
	250	3340	2980	2700	5220	1260	1460	1780	2620
Horizontal pump, x-axis, inlet port	300	4000	3580	3220	6260	1720	1980	2420	3560
	50	525	473	578	910	350	403	490	718
	65	648	595	735	1155	385	420	525	770
	80	788	718	875	1383	403	455	560	823
	100	1050	945	1173	1838	438	508	613	910
	125	1243	1120	1383	2170	525	665	735	1068
	150	1575	1418	1750	2748	613	718	875	1278
	200	2100	1890	2345	3658	805	928	1138	1680
	250	2700	3340	2980	5220	1260	1460	1780	2620
	300	3220	4000	3580	6260	1720	1980	2420	3560
	350	3760	4660	4180	7300	2200	2540	3100	4560

Stainless steel	Diameter DN	Force [N]				Torque [Nm]			
		Fy	Fz	Fx	ΣF^*	My	Mz	Mx	ΣM^*
Horizontal pump, z-axis, outlet port	32	595	735	630	1155	525	595	770	1120
	40	700	875	770	1365	630	735	910	1330
	50	945	1155	1050	1820	700	805	980	1435
	65	1190	1470	1295	2310	770	840	1050	1540
	80	1435	1750	1575	2765	805	910	1120	1645
	100	1890	2345	2100	3675	875	1015	1225	1820
	125	2240	2765	2485	4340	1050	1330	1470	2135
	150	2835	3500	3150	5495	1225	1435	1750	2555
Horizontal pump, x-axis, inlet port	50	1050	945	1155	1820	700	805	980	1435
	65	1295	1190	1470	2310	770	840	1050	1540
	80	1575	1435	1750	2765	805	910	1120	1645
	100	2100	1890	2345	3675	875	1015	1225	1820
	125	2485	2240	2765	4340	1050	1330	1470	2135
	150	3150	2835	3500	5495	1225	1435	1750	2555
	200	4200	3780	4690	7315	1610	1855	2275	3360

* ΣF and ΣM are the vector sums of the forces and torques.

If not all loads reach the maximum permissible value, one of the values is allowed to exceed the normal limit. Contact Grundfos for further information.

10. Electrical connection

The electrical connection must be carried out by a qualified electrician in accordance with local regulations.

Warning

Before removing the terminal box cover and before removing/dismantling the pump, make sure that the power supply has been switched off.

The pump must be connected to an external mains switch.

The operating voltage and frequency are stated on the nameplate. Make sure that the motor is suitable for the power supply of the installation site.

The electrical connection must be carried out as shown in the wiring diagram inside the terminal box cover.

Warning

Whenever using powered equipment in potentially explosive environments, observe the rules and regulations generally or specifically imposed by the relevant responsible authorities or trade organisations.

10.1 Motor protection

Connect three-phase motors to a motor-protective circuit breaker.

All three-phase Grundfos MG and MMG motors of 3 kW and up incorporate a thermistor. See the instructions in the motor terminal box.

Carry out the electrical connection as shown in the wiring diagram on the back side of the terminal box cover.

Warning

Before starting any repair work on motors incorporating a thermal switch or thermistors, make sure that the motor cannot restart automatically after cooling.



10.2 Frequency converter operation

All three-phase motors can be connected to a frequency converter.

Frequency converter operation will often expose the motor insulation system to a heavier load and cause the motor to be more noisy than usual due to eddy currents caused by voltage peaks.

A large motor driven via a frequency converter will be loaded by bearing currents.

Check these operating conditions if the pump is driven via a frequency converter:

Operating conditions	Action
2-, 4- and 6-pole motors, frame size 280 and larger	Check that one of the motor bearings is electrically isolated. Contact Grundfos.
Noise critical applications	Fit an output filter between the motor and the frequency converter. This reduces the voltage peaks and thus the noise.
Particularly noise critical applications	Fit a sinusoidal filter.
Cable length	Fit a cable that meets the specifications laid down by the frequency converter supplier. The length of the cable between motor and frequency converter will affect the motor load.
Supply voltage up to 500 V	Check that the motor is suitable for frequency converter operation.
Supply voltage between 500 V and 690 V	Fit a sinusoidal filter between the motor and the frequency converter which will reduce the voltage peaks and thus the noise, or check that the motor has reinforced insulation.
Supply voltage of 690 V and higher	Fit a dU/dt filter and check that the motor has reinforced insulation.

11. Startup

Caution Do not start the pump until it has been filled with liquid and vented.

11.1 General information

Warning

When pumping drinking water, flush the pump with clean water before startup in order to remove any foreign matters such as preservatives, test liquid or grease.

11.1.1 Flushing the pipe system

The pump is not designed to pump liquids containing solid particles such as pipe debris and welding slag. Before starting up the pump, the pipe system must be thoroughly cleaned, flushed and filled with clean water.

Caution

The warranty does not cover any damage caused by flushing the pipe system by means of the pump.

11.2 Priming

Closed systems or open systems where the liquid level is above the pump inlet

1. Close the isolating valve in the outlet pipe and slowly open the isolating valve in the inlet pipe. Both the pump and the inlet pipe must be completely filled with liquid.
2. Loosen the priming plug in order to vent the pump. Once liquid runs out, tighten the priming plug.

Warning

Pay attention to the orientation of the priming hole to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.



In hot-liquid installations, pay special attention to the risk of personal injury caused by scalding hot liquid.

In cold-liquid installations, pay special attention to the risk of personal injury caused by the cold liquid.

Suction operation with non-return valve

The inlet pipe and the pump must be filled with liquid and vented before the pump is started.

1. Close the isolating valve in the outlet pipe and slowly open the isolating valve in the inlet pipe.
2. Remove the priming plug, M.
3. Pour liquid through the hole until the inlet pipe and the pump are completely filled with liquid.
4. Fit the priming plug, M.

The inlet pipe may be filled and vented via the priming plug. See fig. 24. Alternatively a priming device with funnel can be installed before the pump.

Open systems where the liquid level is below the pump inlet

1. If an isolating valve is fitted on the inlet side of the pump, the valve must be fully open.
2. Close the isolating valve in the outlet pipe and tighten the priming and drain plugs.
3. Connect a manual venting pump instead of a priming device with funnel.
4. Install a slide valve between the venting pump and the centrifugal pump in order to protect the venting pump against excessive pressure.
5. Once the slide valve at the manual venting pump has been opened, vent the inlet pipe using short, rapid pump strokes until the liquid runs out on the outlet side.
6. Close the valve at the venting pump.

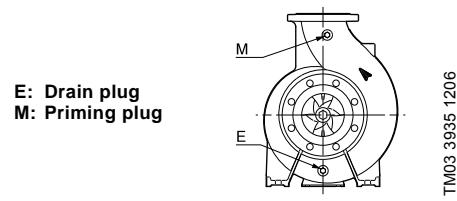


Fig. 24 Drain and priming plug

11.3 Checking the direction of rotation

Warning

The pump must be filled with liquid when checking the direction of rotation.

The correct direction of rotation is shown by arrows on the pump housing. Seen from the pump end, the direction of rotation must be counter-clockwise. See fig. 24.

11.4 Starting up the pump

1. Open the isolating valve on the inlet side of the pump completely and leave the isolating valve on the outlet side almost closed.
2. Start the pump.
3. Vent the pump during startup by loosening the air vent screw in the pump head or pump head cover until a steady stream of liquid runs out of the vent hole.

Warning

Pay attention to the orientation of the vent hole to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.



In hot-liquid installations, pay special attention to the risk of personal injury caused by scalding hot liquid.

In cold-liquid installations, pay special attention to the risk of personal injury caused by the cold liquid.

4. When the pipes have been filled with liquid, slowly open the isolating valve on the outlet side until it is completely open.

If the pump is fitted with a motor with an output selected on the basis of a specific maximum flow rate, the motor may be overloaded if the differential pressure is lower than anticipated.

- Caution**
5. Check the overload by measuring the motor current consumption and comparing the value with the rated current stated on the motor nameplate. In case of overload, throttle the valve on the outlet side until the motor is no longer overloaded.
 6. Always measure the motor current consumption during startup.

Note

At the moment of start, the input current of the motor is up to six times higher than the full-load current stated on the motor nameplate.

11.5 Shaft seal run-in period

The seal faces are lubricated by the pumped liquid, meaning that there may be a certain amount of leakage from the shaft seal. When the pump is started for the first time, or when a new shaft seal has been installed, a certain run-in period is required before the leakage is reduced to an acceptable level. The time required for this depends on the operating conditions, i.e. every time the operating conditions change, a new run-in period will be started.

Under normal conditions, the leaking liquid will evaporate. As a result, no leakage will be detected. Liquids such as kerosene will not evaporate, and drops will be visible, but this is not a shaft seal failure.

Mechanical shaft seals are precision components. If the mechanical shaft seal of a recently installed pump fails, this will normally happen within the first few hours of operation. The main cause of such failures is improper installation of the shaft seals and/or mishandling of the pump during installation.

11.6 Start/stop

Frame size	Maximum number of starts per hour		
	Number of poles		
	2	4	6
56-71	100	250	350
80-100	60	140	160
112-132	30	60	80
160-180	15	30	50
200-225	8	15	30
250-315	4	8	12

11.7 Reference readings of monitoring equipment

We recommend that you take initial readings of these parameters:

- vibration level - use SPM (shock pulse method) measuring points
- inlet and outlet pressure - use pressure gauges.

The readings can be used as reference in case of abnormal operation.

12. Maintenance

Warning

Before starting work on the product, switch off the power supply. Make sure that the power supply cannot be accidentally switched on.

12.1 Pump

The pump is maintenance-free.

12.2 Mechanical shaft seals

Mechanical shaft seals are maintenance-free, working almost without any leakages. If any considerable and increasing seepage occurs, check the mechanical shaft seal immediately. If the sliding surfaces are damaged, replace the entire shaft seal. Treat mechanical shaft seals with the greatest care.

12.3 Motor

Check the motor at regular intervals. It is important to keep the motor clean in order to ensure adequate ventilation. If the pump is installed in a dusty environment, clean and check it regularly.

12.4 Lubrication

Motor bearings

Motors up to and including frame size 132 have maintenance-free, greased-for-life bearings.

Motors larger than frame size 132 must be greased according to the indications on the motor nameplate. Grease spills from the motor may occur.

Grease specifications: See section [12.4.1 Bearing grease](#).

12.4.1 Bearing grease

Use lithium-based grease according to the following specifications:

- NLGI class 2 or 3
- viscosity of basic oil: 70 to 150 cSt at +40 °C
- temperature range: -30 °C - +140 °C during continuous operation.

13. Periods of inactivity and frost protection

Pumps which are not being used during periods of frost must be drained to avoid damage.

Drain the pump by removing the drain plug. See fig. 24.

Do not tighten the priming plug or replace the drain plug until the pump is to be used again.

Warning

Take care to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.

 In hot-liquid installations, pay special attention to the risk of personal injury caused by scalding hot liquid.

In cold-liquid installations, pay special attention to the risk of personal injury caused by the cold liquid.

If the pump is to be drained prior to a long period of inactivity, inject a few drops of silicone oil on the shaft at the bearing bracket. This prevents the shaft seal faces from seizing up.

14. Service

Warning

 If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

If you request Grundfos to service such a pump, contact Grundfos with details about the pumped liquid, etc. before you return the pump for service. Otherwise Grundfos can refuse to accept the pump for service.

Possible costs of returning the pump are paid by the customer.

14.1 Service kits

Service kits for NB, NBG, see Grundfos Product Center in www.grundfos.com or Service Kit Catalogue.

15. Technical data

15.1 Electrical data

See the motor nameplate.

15.2 Sound pressure level

The data in this table applies for pumps including motor, (MG, MMG, Siemens and TECO motors).

The values stated are maximum sound pressure levels. Tolerances are according to ISO 4871.

50 Hz

2-pole: n = 2900 min⁻¹

4-pole: n = 1450 min⁻¹

6-pole: n = 970 min⁻¹

60 Hz

2-pole: n = 3500 min⁻¹

4-pole: n = 1750 min⁻¹

6-pole: n = 1170 min⁻¹

Motor [kW]	Maximum sound pressure level [dB(A)] - ISO 3743		
	2-pole	4-pole	6-pole
0.25	56	41	-
0.37	56	45	-
0.55	57	42	40
0.75	56	42	43
1.1	59	50	43
1.5	58	50	47
2.2	60	52	52
3	59	52	63
4	63	54	63
5.5	63	57	63
7.5	60	58	66
11	60	60	66
15	60	60	66
18.5	60	63	66
22	66	63	66
30	71	65	59
37	71	66	60
45	71	66	58
55	71	67	58
75	73	70	61
90	73	70	61
110	76	70	61
132	76	70	61
160	76	70	65
200	76	70	-
250	82	73	-
315	82	73	-
355	77	75	-
400	-	75	-

Motor [kW]	Maximum sound pressure level [dB(A)] - ISO 3743		
	2-pole	4-pole	6-pole
0.25	-	-	-
0.37	-	-	-
0.55	-	-	-
0.75	-	-	-
1.1	64	51	43
1.5	64	52	47
2.2	65	55	52
3	54	57	63
4	68	56	63
5.5	68	62	63
7.5	73	62	66
11	70	66	66
15	70	66	66
18.5	70	63	66
22	70	63	66
30	71	65	62
37	71	65	63
45	75	65	62
55	75	68	62
75	77	71	66
90	77	71	66
110	81	75	66
132	81	75	66
160	81	75	69
200	81	75	-
280	86	-	-
288	-	77	-
353	86	-	-
362	-	77	-
398	81	-	-
408	-	79	-
460	-	79	-

16. Fault finding

Warning

 Before removing the terminal box cover and before removing/dismantling the pump, make sure that the power supply has been switched off and that it cannot be accidentally switched on again.

Fault	Cause	Remedy
1. Pump delivers no or too little liquid.	a) Wrong electrical connection, for instance two phases. b) Wrong direction of rotation. c) Air in inlet pipe. d) Counter-pressure is too high. e) Inlet pressure is too low. f) Inlet pipe or impeller blocked by impurities. g) Pump draws in air due to defective seal. h) Pump draws in air due to low liquid level.	Check the electrical connection and remedy, if necessary. Interchange two phases of the power supply. Vent the inlet pipe or the pump. Set the duty point in accordance with the data sheet. Check the system for impurities. Increase the liquid level on the inlet side. Open the isolating valve in the inlet pipe. Make sure that all the conditions in section 8.5 Pipework are complied with. Clean the inlet pipe or pump. Check the pipeline seals, pump housing gaskets and shaft seals. Replace gaskets and seals, if necessary. Increase the liquid level on the inlet side and keep it as constant as possible.
2. Motor-protective circuit breaker has tripped because the motor is overloaded.	a) Pump blocked by impurities. b) Pump running above rated duty point. c) Density or viscosity of liquid higher than specified when ordering. d) Motor-protective circuit breaker overload setting incorrect. e) Motor runs on two phases.	Clean the pump. Set the duty point in accordance with the data sheet. If less flow is sufficient, reduce the flow on the outlet side. Otherwise, fit a more powerful motor. Check the setting of the motor-protective circuit breaker and adjust it, if necessary. Check the electrical connection. Replace the fuse, if defective.

Fault	Cause	Remedy
3. Pump makes too much noise. Pump runs unevenly and vibrates.	a) Inlet pressure too low, i.e. pump cavitates. b) Air in inlet pipe or pump. c) Counter-pressure lower than specified. d) Pump draws in air due to low liquid level. e) Impeller out of balance or clogged impeller blades. f) Inner parts worn. g) Pump stressed by pipes thus causing starting noise. h) Defective bearings. i) Defective motor fan. j) Foreign bodies in pump. k) Frequency converter operation.	Increase the liquid level on the inlet side. Open the isolating valve in the inlet pipe. Make sure that all the conditions in section 8.5 Pipework are complied with. Vent the inlet pipe or the pump. Set the duty point in accordance with the data sheet. Increase the liquid level on the inlet side and keep it as constant as possible. Clean and check the impeller. Replace the defective parts. Mount the pump so that it is not stressed. Support the pipes. Replace the bearings. Replace the fan. Clean the pump. See section 10.2 Frequency converter operation .
4. Leaking pump, connections or mechanical shaft seal.	a) Pump stressed by pipes thus causing leaks in pump housing or at connections. b) Pump housing gaskets and gaskets at connections defective. c) Mechanical shaft seal dirty or stuck together. d) Mechanical shaft seal defective. e) Shaft surface defective.	Mount the pump so that it is not stressed. Support the pipes. Replace pump housing gaskets or gaskets at connections. Check and clean the mechanical shaft seal. Replace the mechanical shaft seal. Replace the shaft.
5. Too high temperature in pump or motor.	a) Air in inlet pipe or pump. b) Inlet pressure too low. c) Bearings lubricated with too little, too much or unsuitable lubricant. d) Axial pressure too high. e) Motor-protective circuit breaker defective or setting incorrect. f) Motor overloaded.	Vent the inlet pipe or the pump and replenish. Increase the liquid level on the inlet side. Open the isolating valve in the inlet pipe. Make sure that all the conditions in section 8.5 Pipework are complied with. Replenish, reduce or replace the lubricant. Check the relief holes of the impeller and the lock rings on the inlet side. Check the setting of the motor-protective circuit breaker and replace, if necessary. Reduce the flow rate.

17. Disposal

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

Argentina

Bombas GRUNDFOS de Argentina S.A.
Ruta Panamericana km. 37.500 Centro
Industrial Garín
1619 Garín Pcia. de B.A.
Phone: +54-3327 414 444
Telefax: +54-3327 45 3190

Australia

GRUNDFOS Pumps Pty. Ltd.
P.O. Box 2040
Regency Park
South Australia 5942
Phone: +61-8-8461-4611
Telefax: +61-8-8340 0155

Austria

GRUNDFOS Pumpen Vertrieb
Ges.m.b.H.
Grundfosstraße 2
A-5082 Grödig/Salzburg
Tel.: +43-6246-883-0
Telefax: +43-6246-883-30

Belgium

N.V. GRUNDFOS Bellux S.A.
Boomsesteenweg 81-83
B-2630 Aartselaar
Tél.: +32-3-870 7300
Télécopie: +32-3-870 7301

Belarus

Представительство ГРУНДФОС в
Минске
220125, Минск
ул. Шаффарнянская, 11, оф. 56, БЦ
«Порт»
Тел.: +7 (375 17) 286 39 72/73
Факс: +7 (375 17) 286 39 71
E-mail: minsk@grundfos.com

Bosnia and Herzegovina

GRUNDFOS Sarajevo
Zmaja od Bosne 7-7A,
BH-71000 Sarajevo
Phone: +387 33 592 480
Telefax: +387 33 590 465
www.ba.grundfos.com
e-mail: grundfos@bih.net.ba

Brazil

BOMBAS GRUNDFOS DO BRASIL
Av. Humberto de Alencar Castelo
Branco, 630
CEP 09850 - 300
São Bernardo do Campo - SP
Phone: +55-11 4393 5533
Telefax: +55-11 4343 5015

Bulgaria

Grundfos Bulgaria EOOD
Slatina District
Iztochna Tangenta street no. 100
BG - 1592 Sofia
Tel. +359 2 49 22 200
Fax. +359 2 49 22 201
email: bulgaria@grundfos.bg

Canada

GRUNDFOS Canada Inc.
2941 Brighton Road
Oakville, Ontario
L6H 8C9
Phone: +1-905 829 9533
Telefax: +1-905 829 9512

China

GRUNDFOS Pumps (Shanghai) Co. Ltd.
10F The Hub, No. 33 Suhong Road
Minhang District
Shanghai 201106
PRC
Phone: +86 21 612 252 22
Telefax: +86 21 612 253 33

Croatia

GRUNDFOS CROATIA d.o.o.
Buzinski prilaz 38, Buzin
HR-10010 Zagreb
Phone: +385 1 6595 400
Telefax: +385 1 6595 499
www.hr.grundfos.com

Czech Republic

GRUNDFOS s.r.o.
Čajkovského 21
779 00 Olomouc
Phone: +420-585-716 111
Telefax: +420-585-716 299

Denmark

GRUNDFOS DK A/S
Martin Bachs Vej 3
DK-8850 Bjerringbro
Tlf.: +45-87 50 50
Telefax: +45-87 50 51 51
E-mail: info_GDK@grundfos.com
www.grundfos.com/DK

Estonia

GRUNDFOS Pumps Eesti OÜ
Peterburgi tee 92G
11416 Tallinn
Tel: +372 606 1690
Fax: +372 606 1691

Finland

OY GRUNDFOS Pumpum AB
Trukkikuja 1
FI-01360 Vantaa
Phone: +358-(0) 207 889 500
Telefax: +358-(0) 207 889 550

France

Pompes GRUNDFOS Distribution S.A.
Parc d'Activités de Chesnés
57, rue de Malacombe
F-38290 St. Quentin Fallavier (Lyon)
Tél.: +33-4 74 82 15 15
Télécopie: +33-4 74 94 10 51

Germany

GRUNDFOS GMBH
Schlüterstr. 33
40699 Erkrath
Tel.: +49-(0) 211 929 69-0
Telefax: +49-(0) 211 929 69-3799
e-mail: infoservice@grundfos.de
Service in Deutschland:
e-mail: kundendienst@grundfos.de

Greece

GRUNDFOS Hellas A.E.B.E.
20th km. Athinon-Markopoulou Av.
P.O. Box 71
GR-19002 Peania
Phone: +0030-210-66 83 400
Telefax: +0030-210-66 46 273

Hong Kong

GRUNDFOS Pumps (Hong Kong) Ltd.
Unit 1, Ground floor
Siu Wai Industrial Centre
29-33 Wing Hong Street &
68 King Lam Street, Cheung Sha Wan
Kowloon
Phone: +852-27861706 / 27861741
Telefax: +852-27858664

Hungary

GRUNDFOS Hungária Kft.
Park u. 8
H-2045 Törökbalint,
Phone: +36-23 511 110
Telefax: +36-23 511 111

India

GRUNDFOS Pumps India Private
Limited
118 Old Mahabalipuram Road
Thoraipakkam
Chennai 600 096
Phone: +91-44 2496 6800

Indonesia

PT. GRUNDFOS POMPA
Graha Intirub Lt. 2 & 3
Jln. Ciliilitan Besar No.454. Makasar,
Jakarta Timur
ID-Jakarta 13650
Phone: +62 21-469-51900
Telefax: +62 21-460 6910 / 460 6901

Ireland

GRUNDFOS (Ireland) Ltd.
Unit A, Merrywell Business Park
Ballymount Road Lower
Dublin 12
Phone: +353-1-4089 800
Telefax: +353-1-4089 830

Italy

GRUNDFOS Pompe Italia S.r.l.
Via Gran Sasso 4
I-20060 Truccazzano (Milano)
Tel.: +39-02-95838112
Telefax: +39-02-95309290 / 95838461

Japan

GRUNDFOS Pumps K.K.
1-2-3, Shin-Miyakoda, Kita-ku,
Hamamatsu
431-2103 Japan
Phone: +81 53 428 4760
Telefax: +81 53 428 5005

Korea

GRUNDFOS Pumps Korea Ltd.
6th Floor, Ajoo Building 679-5
Yeoksam-dong, Kangnam-ku, 135-916
Seoul, Korea
Phone: +82-2-5317 600
Telefax: +82-2-5633 725

Latvia

SIA GRUNDFOS Pumps Latvia
Deglava biznesa centrs
Augusta Deglava ielā 60, LV-1035, Rīga,
Tāl.: + 371 714 9640, 7 149 641
Fakss: + 371 914 9646

Lithuania

GRUNDFOS Pumps UAB
Smolensko g. 6
LT-03201 Vilnius
Tel: + 370 52 395 430
Fax: + 370 52 395 431

Malaysia

GRUNDFOS Pumps Sdn. Bhd.
7 Jalan Peguam U1/25
Glenmarie Industrial Park
40150 Shah Alam
Selangor
Phone: +60-3-5569 2922
Telefax: +60-3-5569 2866

Mexico

Bombas GRUNDFOS de México S.A. de C.V.
Boulevard TLC No. 15
Parque Industrial Stiva Aeropuerto
Apodaca, N.L. 66600
Phone: +52-81-8144 4000
Telefax: +52-81-8144 4010

Netherlands

GRUNDFOS Netherlands
Veluwzezoom 35
1326 AE Almere
Postbus 22015
1302 CA ALMERE
Tel.: +31-88-478 6336
Telefax: +31-88-478 6332
E-mail: info_gni@grundfos.com

New Zealand

GRUNDFOS Pumps NZ Ltd.
17 Beatrice Tinsley Crescent
North Harbour Industrial Estate
Albany, Auckland
Phone: +64-9-415 3240
Telefax: +64-9-415 3250

Norway

GRUNDFOS Pumper A/S
Strømsveien 344
Postboks 235, Leirdal
N-1011 Oslo
Tlf.: +47-22 90 47 00
Telefax: +47-22 32 21 50

Poland

GRUNDFOS Pompy Sp. z o.o.
ul. Klonowa 23
Baranowo, k. Poznania
PL-62-081 Przeźmierowo
Tel: (+48-61) 650 13 00
Fax: (+48-61) 650 13 50

Portugal

Bombas GRUNDFOS Portugal, S.A.
Rua Calvet da Magalhães, 241
Apartado 1079
P-2770-153 Paço de Arcos
Tel.: +351-21-440 76 00
Telefax: +351-21-440 76 90

Romania

GRUNDFOS Pompe România SRL
Bd. Biruintei, nr 103
Pantelimon county Ilfov
Phone: +40 21 200 4100
Telefax: +40 21 200 4101
E-mail: romania@grundfos.ro

Russia

ООО Грундфос Россия
109544, г. Москва, ул. Школьная, 39-
41, стр. 1
Тел. (+7) 495 564-88-00 (495) 737-30-
00
Факс (+7) 495 564 88 11
E-mail grundfos.moscow@grundfos.com

Serbia

Grundfos Srbija d.o.o.
Omladinskih brigada 90b
11070 Novi Beograd
Phone: +381 11 2258 740
Telefax: +381 11 2281 769
www.rs.grundfos.com

Singapore

GRUNDFOS (Singapore) Pte. Ltd.
25 Jalan Tukang
Singapore 619264
Phone: +65-6681 9688
Telefax: +65-6681 9689

Slovakia

GRUNDFOS s.r.o.
Prievozská 4D
821 09 BRATISLAVA
Phone: +421 2 5020 1426
sk.grundfos.com

Slovenia

GRUNDFOS LJUBLJANA, d.o.o.
Leskoškova 9e, 1122 Ljubljana
Phone: +386 (0) 1 568 06 10
Telefax: +386 (0) 1 568 06 19
E-mail: tehnika-si@grundfos.com

South Africa

GRUNDFOS (PTY) LTD
Corner Mountjoy and George Allen
Roads
Wilbart Ext. 2
Bedfordview 2008
Phone: (+27) 11 579 4800
Fax: (+27) 11 455 6066
E-mail: lsmart@grundfos.com

Spain

Bombas GRUNDFOS España S.A.
Caminio de la Fuentecilla, s/n
E-28110 Algete (Madrid)
Tel.: +34-91-848 8800
Telefax: +34-91-628 0465

Sweden

GRUNDFOS AB
Box 333 (Lunnagårdsgatan 6)
431 24 Mölndal
Tel.: +46 31 332 23 000
Telefax: +46 31 331 94 60

Switzerland

GRUNDFOS Pumpen AG
Bruggacherstrasse 10
CH-8117 Fällanden/ZH
Tel.: +41-44-806 8111
Telefax: +41-44-806 8115

Taiwan

GRUNDFOS Pumps (Taiwan) Ltd.
7 Floor, 219 Min-Chuan Road
Taichung, Taiwan, R.O.C.
Phone: +886-4-2305 0868
Telefax: +886-4-2305 0878

Thailand

GRUNDFOS (Thailand) Ltd.
92 Chaloem Phrakiat Rama 9 Road,
Dokmai, Pravej, Bangkok 10250
Phone: +66-2-725 8999
Telefax: +66-2-725 8998

Turkey

GRUNDFOS POMPA San. ve Tic. Ltd.
Sti.
Gebze Organize Sanayi Bölgesi
Ihsan dede Caddesi,
2. yol 200, Sokak No. 204
41490 Gebze/ Kocaeli
Phone: +90 - 262-679 7979
Telefax: +90 - 262-679 7905
E-mail: satis@grundfos.com

Ukraine

Бізнес Центр Європа
Столичне шосе, 103
м. Київ, 03131, Україна
Телефон: +(38 044) 237 04 00
Факс: +(38 044) 237 04 01
E-mail: ukraine@grundfos.com

United Arab Emirates

GRUNDFOS Gulf Distribution
P.O. Box 16768
Jebel Ali Free Zone
Dubai
Phone: +971 4 8815 166
Telefax: +971 4 8815 136

United Kingdom

GRUNDFOS Pumps Ltd.
Grovebury Road
Leighton Buzzard/Beds. LU7 4TL
Phone: +44-1525-850000
Telefax: +44-1525-850011

U.S.A.

GRUNDFOS Pumps Corporation
17100 West 118th Terrace
Olathe, Kansas 66061
Phone: +1-913-227-3400
Telefax: +1-913-227-3500

Uzbekistan

Grundfos Tashkent, Uzbekistan The Representative Office of Grundfos Kazakhstan in Uzbekistan
38a, Oybek street, Tashkent
Телефон: +(998) 71 150 3290 / 71 150 3291
Факс: +(998) 71 150 3292

Addresses Revised 29.07.2016

be think innovate

96483177 0716

ECM: 1189747

www.grundfos.com

GRUNDFOS 

The name Grundfos, the Grundfos logo, and **be think innovate** are registered trademarks owned by Grundfos Holding A/S or Grundfos A/S, Denmark. All rights reserved worldwide.

© Copyright Grundfos Holding A/S