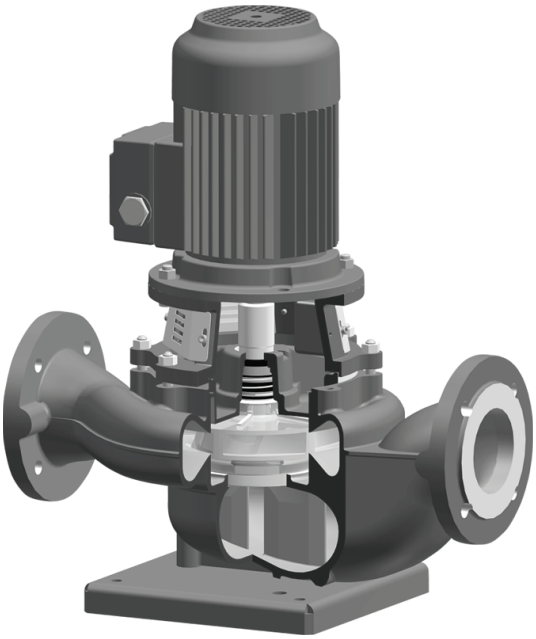
Johnson Pump®

INSTRUCTION MANUAL

CombiLineBloc

In-line circulation pump in block execution



REVISION: CLB/EN (2502) 6.8

SPXFLOW®

Orginal instructions

Read and understand this manual prior to operating or servicing this product.

EC Declaration of Conformity

(Directive 2006/42/EC, appendix II-A)

Manufacturer

SPX Flow Technology Assen B.V.
Dr. A.F. Philipsweg 51
9403 AD Assen
The Netherlands

hereby declares that all pumps member of productfamilies CombiBloc, CombiBlocHorti, CombiChem, CombiLine, CombiLineBloc and CombiNorm whether delivered without drive, or delivered as an assembly with drive, are in conformity with the applicable provisions of the following Regulation, Directives and standards:

- Regulation (EU) No 547/2012, “Ecodesign requirements for water pumps”
- Directive 2006/42/EC, “Machinery Directive”
- EC directive 2014/35/EU, "Electric equipment for use within certain voltage limits"
- EC directive 2014/30/EU, “ElectroMagnetic Compatibility”
- standards EN-ISO 12100, EN 809, EN 16480
- standard EN 60204-1 if applicable

The pumps to which this declaration refers may only be put into operation after they have been installed in the way prescribed by the manufacturer, and, as the case may be, after the complete system of which these pumps form part, has been made to fulfil all applicable essential Health & Safety requirements.

EC Declaration of Incorporation

(Directive 2006/42/EC, appendix II-B)

Manufacturer

SPX Flow Technology Assen B.V.
Dr. A.F. Philipsweg 51
9403 AD Assen
The Netherlands

hereby declares that the partly completed pump (Back-Pull-Out unit), member of product-families CombiBloc, CombiBlocHorti, CombiChem, CombiLine, CombiLineBloc and CombiNorm is in conformity with the provisions of Directive 2006/42/EC as well as with the following standards:

- EN-ISO 12100, EN 809

and that this partly completed pump is meant to be incorporated into the specified pump unit and may only be put into use after the complete machine of which the pump under consideration forms part has been made and declared to comply with all Directives.

These declarations are issued under the sole responsibility of the manufacturer

Assen, October 1st 2024

H. Hoving,

Director Operations.

Instruction manual

SPX FLOW is a global multi-industry manufacturing leader. The company's highly-specialized, engineered products and innovative technologies are helping to meet rising global demand for electricity and processed foods and beverages, particularly in emerging markets.

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Table of Contents

1 Introduction

1.1 Preface

This manual is intended for technicians and maintenance staff and for those who are in charge of ordering spare parts.

This manual contains important and useful information for the proper operation and maintenance of this pump. It also contains important instructions to prevent potential accidents and damage, and to ensure safe and fault-free operation of this pump.

! **Read this manual carefully before commissioning the pump, familiarize yourself with the operation of the pump and strictly obey the instructions!**

The data published here comply with the most recent information at the time of going to press. However they may be subject to later modifications.

SPXFLOW reserves the right to change the construction and design of the products at any time without being obliged to change earlier deliveries accordingly.

1.2 Safety

This manual contains instructions for working safely with the pump. Operators and maintenance staff must be familiar with these instructions.
Installation, operation and maintenance has to be done by qualified and well prepared personnel.

Below is a list of the symbols used for those instructions and their meaning:

⚠ ***Personal danger for the user. Strict and prompt observance of the corresponding instruction is imperative!***

! **Risk of damage or poor operation of the pump. Follow the corresponding instruction to avoid this risk.**

➢ *Useful instruction or tip for the user.*

Items which require extra attention are shown in **bold print**.

This manual has been compiled by SPXFLOW with the utmost care. Nevertheless SPXFLOW cannot guarantee the completeness of this information and therefore assumes no liability for possible deficiencies in this manual. The buyer/user shall at all times be responsible for testing the information and for taking any additional and/or deviating safety measures. SPXFLOW reserves the right to change safety instructions.

1.3 Guarantee

SPXFLOW shall not be bound to any guarantee other than the guarantee accepted by SPXFLOW. In particular, SPXFLOW will not assume any liability for explicit and/or implicit guarantees such as but not limited to the marketability and/or suitability of the products supplied.

The guarantee will be cancelled immediately and legally if:

- Service and/or maintenance is not undertaken in strict accordance with the instructions.
- The pump is not installed and operated in accordance with the instructions.
- Necessary repairs are not undertaken by our personnel or are undertaken without our prior written permission.
- Modifications are made to the products supplied without our prior written permission.
- The spare parts used are not original SPXFLOW parts.
- Additives or lubricants used are other than those prescribed.
- The products supplied are not used in accordance with their nature and/or purpose.
- The products supplied have been used amateurishly, carelessly, improperly and/or negligently.
- The products supplied become defective due to external circumstances beyond our control.

All parts which are liable to wear are excluded from guarantee. Furthermore, all deliveries are subject to our "General conditions of delivery and payment", which will be forwarded to you free of charge on request.

1.4 Inspection of delivered items

Check the consignment immediately on arrival for damage and conformity with the advice note. In case of damage and/or missing parts, have a report drawn up by the carrier at once.

1.5 Instructions for transport and storage

1.5.1 Weight

A pump or a pump unit is generally too heavy to be moved by hand. Therefore, use the correct transport and lifting equipment. Weight of the pump or pump unit are shown on the label on the cover of this manual.

1.5.2 Use of pallets

Usually a pump or pump unit is shipped on a pallet. Leave it on the pallet as long as possible to avoid damages and to facilitate possible internal transport.

! When using a forklift always set the forks as far apart as possible and lift the package with both forks to prevent it from toppling over! Avoid jolting the pump when moving it!

1.5.3 Hoisting

⚠ ***When lifting a complete pump unit always use a proper and sound lifting device, approved to bear the total weight of the load!***

⚠ ***Never go underneath a load that is being lifted!***

! **If the electric motor is provided with a lifting eye, this lifting eye is intended only for the purpose of carrying out service activities to the electric motor! The lifting eye is designed to bear the weight of the electric motor only! It is NOT permitted to lift a complete pump unit at the lifting eye of an electric motor!**

1.5.4 Opening the packaging

The pump may be packed in a cardboard box with wooden bottom. The boxes are kept shut by 2 plastic straps. These straps also serve to keep the bottom and the covering box together.

⚠ ***Always make sure that the box stands on the floor!***
Wear gloves: the straps are under tension and may be sharp!

1 Cut the plastic straps.
2 Remove the covering box.
3 Unscrew the pump from the bottom.
4 Rest the pump on the supporting brackets under the suction bend.

1.5.5 Storage

If the pump is not to be used immediately the stub shaft must be turned by hand twice per week.

1.6 Ordering parts

This manual contains a survey of the spare parts recommended by SPXFLOW as well as the instructions for ordering them. A fax-order form is included in this manual.

You should always state all data stamped on the type plate when ordering parts and in any other correspondence regarding the pump.

➢ *This data is also printed on the label on the front of this manual.*

If you have any questions or require further information with regard to specific subjects, then do not hesitate to contact SPXFLOW.

2 General

2.1 Pump description

The CombiLineBloc is a built-in circulation pump constructed with a lantern piece and a standard IEC electric motor with flange. That means that the medium to be pumped will not get into the electric motor. The pump is provided with a mechanical seal with bellows mounted on the stub shaft which is mounted directly on the motor shaft. The pump has been designed as a monobloc pump which means that pump, lantern piece and electric motor have been assembled to form one compact unit. Suction and delivery flange are in-line, so the pump can easily be built into straight pipes without a foundation being required. The pump can also be mounted with the suction bend placed on a fundation by means of the special support device. The pumps are available in 2 speeds. The flanges are according to EN 1092-2 (DIN 2532) PN10 or EN 1092-2 (DIN 2531) PN6.

2.2 Applications

- In general, this pump can be used for thin, clean or slightly polluted liquids. These liquids should not affect the pump materials.
- Further details about the application possibilities of your specific pump are mentioned in the order confirmation and/or in the data sheet enclosed with the delivery.
- Do not use the pump for purposes other than those for which it is delivered without prior consultation with your supplier.

⚠ ***Using a pump in a system or under system conditions (liquid, working pressure, temperature, etc.) for which it has not been designed may hazard the user!***

2.3 Type code

Pumps are available in various designs. The main characteristics of the pump are shown in the type code.

Example: **CLB 65-200 G1**

Pump family	
CLB	**C**ombi**L**ine**B**loc
Pump size	
65	diameter discharge connection [mm]
200	nominal impeller diameter [mm]
Pump casing material	
G	cast iron
B	bronze
Impeller material	
1	cast iron
2	bronze

2.4 Serial number

Serial number of the pump or pump unit are shown on the name plate off the pump and on the label on the cover of this manual.

Example: **19-001160**

19	year of manufacture
001160	unique number

2.5 Bearing groups

The pump range is divided in a number of bearing groups.

Table 1: Bearing group division.

Bearing groups			
1	**2**	**2V**	**3**
40C-125	80A-250	200-160	150-250
40-160	100-200		
40-200	100A-250		
50-125	125-160		
50-160	125C-200		
50-200	125A-250		
65-125	150-160		
65-160	150-200		
65-200	200-200		
80-125			
80-160			
80-200			
100-160			
150-125			

2.6 Construction

2.6.1 Design

The design is characterized by a compact construction. The pump is mounted to a standard IEC flange motor by means of a lantern piece and a stub shaft. The pump cover is clamped between the pump casing and the lantern piece.

The electric motors up to and including frame size 112M have B5 mounting arrangement and the larger types have B3/B5 mounting arrangement. All vertically placed motors have mounting arrangement V1.

2.6.2 Pump casing/impeller

- The pump casing is of the volute type. Suction and delivery flange are placed in-line and have the same flange size.
- The specially shaped suction bend ensures low-noise functioning of the pump and favorable NPSH values.
- The impeller is of the closed type and is mounted directly on the end of the stub shaft. The impeller is fixed by means of a cap nut.

2.6.3 Mechanical seal

The pump is provided with a mechanical seal with mounting dimensions according to EN 12756 (L_{1K}) (DIN 24960 (L_{1K})). This mechanical seal can be used up to a working pressure of 10 bar and a temperature of 120 °C (peak values of 140 °C).

2.6.4 Bearing construction

The bearing is provided by the motor bearings. The selection of the motor-pump combination is such that the bearings of the applied electric motors can absorb the axial and radial forces without the bearing life being affected.

The electric motors must be provided with a **fixed bearing**.

2.7 Ecodesign Minimum Efficiency Requirements Water Pumps

- Directive 2005/32/EC of the European Parliament and of the Council;
- Commission regulation (EU) No 547/2012 Implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water pumps.

2.7.1 Introduction

SPX Flow Technology Assen B.V. is an associate member of the HOLLAND PUMP GROUP, an associate member of EUROPUMP, the organization of European pump manufacturers.

Europump promotes the interest of the European pump industry with the European institutions.

Europump welcomes the aim of the European Commission to reduce eco-impact of products in the European Union. Europump is fully aware of the eco-impact of pumps in Europe. For many years the ecopump initiative is one of the strategic columns in the work of Europump. From the first of January 2013 the regulation is coming into force concerning minimum required efficiencies of rotodynamic water pumps. The regulation sets minimum efficiency requirements on water pumps set out under the Ecodesign Directive for energy related products. This regulation mainly addresses manufacturers of water pumps placing these products on the European market. But as a consequence customers may also be affected by this regulation. This document gives necessary information related to the coming into force of the water pump regulation EU 547/2012.

2.7.2 Implementing Directive 2009/125/EC

- Definitions:

"This Regulation establishes eco-design requirements for the placing on the market of rotodynamic water pumps for pumping clean water, including where integrated in other products."
"Water pump" is the hydraulic part of a device that moves clean water by physical or mechanical action and is of one of the following designs:

- End suction own bearing (ESOB);
- End suction close coupled (ESCC);
- End suction close coupled inline (ESCCi);
- Vertical multistage (MS-V);
- Submersible multistage (MSS);"

'*End suction water pump*' (ESOB) means a glanded single stage end suction rotodynamic water pump designed for pressures up to 1600 kPa (16 bar), with a specific speed ns between 6 and 80 rpm, a minimum rated flow of 6 m^3/h, a maximum shaft power of 150 kW, a maximum head of 90 m with nominal speed of 1450 rpm and a maximum head of 140 m with nominal speed of 2900 rpm;

'*End suction close coupled water pump*' (ESCC) is an end suction water pump of which the motor shaft is extended to become also the pump shaft;

'*End suction close coupled inline water pump*' (ESCCi) means a water pump of which the water inlet of the pump is on the same axis as the water outlet of the pump;

'*Vertical multistage water pump*' (MS-V) means a glanded multistage (i > 1) rotodynamic water pump in which the impellers are assembled on a vertical rotating shaft, which is designed for pressures up to 2500 kPa (25 bar), with a nominal speed of 2900 rpm and a maximum flow of 100 m^3/h;

'*Submersible multistage water pump*' (MSS) means a multistage (i > 1) rotodynamic water pump with a nominal outer diameter of 4" (10,16 cm) or 6" (15,24 cm) designed to be operated in a borehole at nominal speed of 2900 rpm, at operating temperatures within a range of 0°C and 90°C;

This Regulation shall not apply to:

1 water pumps designed specifically for pumping clean water at temperatures below -10°C or above +120°C;

2 water pumps designed only for fire-fighting applications;

3 displacement water pumps;

4 self-priming water pumps.

- Enforcement:

In order to enforce this there will be a **Minimum Efficiency Index** (M.E.I.) criteria set for the above list of pumps.
The MEI is a dimensionless figure that is derived from a complex calculation based on the efficiencies at BEP (Best Efficiency Point), 75% BEP & 110% BEP, and the specific speed. The range is used so that manufacturers do not take an easy option of providing good efficiency at one point i.e. BEP.
The value ranges from 0 to 1,0 with the lower value being less efficient, this provides the basis of eliminating the less efficient pumps starting with 0,10 in 2013 (the lowest 10%) and 0,40 (the lowest 40%) in 2015.
The MEI value of 0,70 is classed benchmark for the most efficient pumps in the market at the time of developing the directive.

The milestones for the MEI values are as follows;

1 1st January 2013 all pumps shall have a minimum MEI value of 0,10;

2 1st January 2015 all pumps shall have a minimum MEI value of 0,40.

The most important point of this is that unless the pumps comply then they will not be allowed to have a CE marking.

- Part Load Performance

It is common practice that pumps spend much of their time working away from their rated duty, and efficiency can fall off rapidly below the 50% duty point, any scheme should take account of this real life performance. However, manufacturers need a pump efficiency classification scheme that makes it impossible to design pumps with a steep fall off in efficiency either side of the BEP point in order to claim a higher efficiency than would be typical of real life operation.

- 'House of Efficiency'

The decision scheme 'House of Efficiency' takes into account design and application purposes as well as the pump minimum efficiency dependence on flow. The minimum acceptable efficiency is therefore different for each pump type. The pass-or-fail scheme is based on two criteria A and B.

Criterion A is the pass-or-fail minimum efficiency requirement at the best efficiency point (BEP) of the pump:

$$\eta_{Pump}\langle n_s, Q_{BEP}\rangle \geq \eta_{BOTTOM}$$

Where

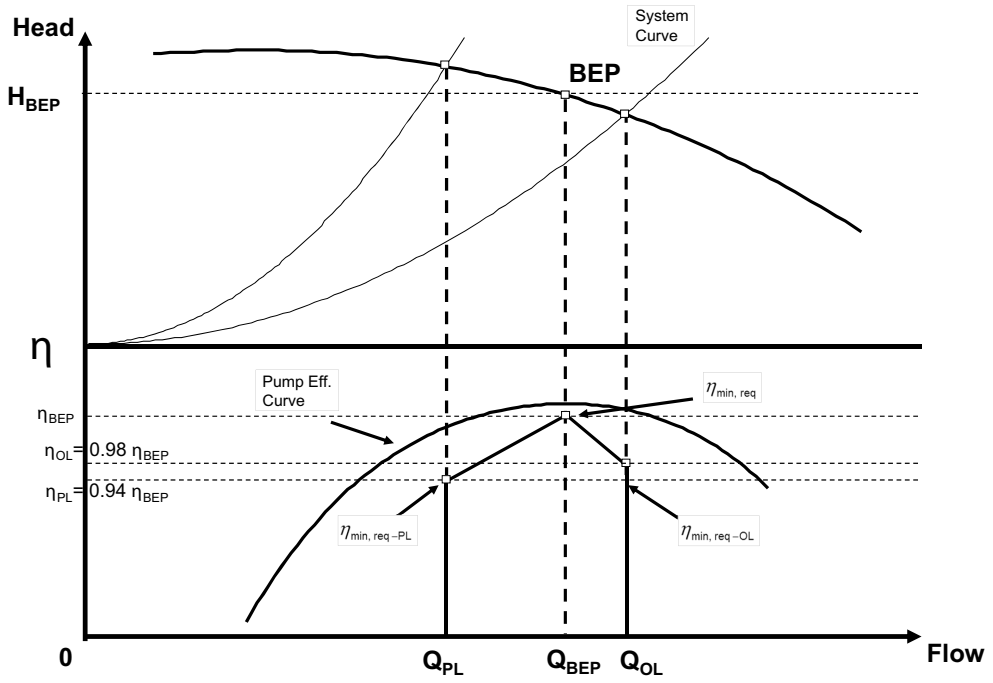
$$n_s = n_N \times \frac{\sqrt{Q_{BEP}}}{H_{BEP}^{0,75}}$$

Criterion B is the pass-or-fail minimum efficiency requirement at part load (PL) and at overload (OL) of the pump:

$$\eta_{BOTTOM-PL,\,OL} \geq x \cdot \eta_{BOTTOM}$$

Therefore a method is devised what is called a “house of efficiency” scheme that also requires pumps to pass efficiency thresholds at 75% and 110% of rated flow. The advantage of this is that pumps will be penalised for poor efficiency away from rated efficiency, hence it will take account of real life pump duties.
It should be stated that while the scheme may appear complicated at first sight, in practice it has been easy for the manufacturers to apply the scheme to their pumps.

Figure 1: House of Efficiency



2.7.3 Energy Efficient Pump Selection

In selecting the pump, care should be taken to ensure that the duty point required is as close as possible to the pump's Best Efficiency Point (BEP). Different heads and flows can be achieved by changing the diameter of the impeller and thereby eliminating unnecessary energy loss.

The same pump can be offered at different motor speeds to allow the pump to be used over a much wider range of duties. For instance, changing from 4-pole motor to 2-pole motor will enable the same pump to deliver twice as much peak flow at 4 times the head.

Variable speed drives allow the pump to operate efficiently over a wide range of speeds hence duties in an energy efficient manner. They are particularly useful in systems where is a variation in required flow.

A very useful tool for energy efficient pump selection is the web-based software program "Hydraulic Investigator 3 (HI-3)" from the SPXFLOW website.

Hydraulic Investigator is the selection guide for centrifugal pumps and search by pump family and pump type starting from entering required capacity and head. Further refine the pump curves to find the pump that meets your specification.

The default setting of applicable pump types is prioritized on highest efficiency. In the standard automated selection procedure the optimum (trimmed) impeller diameter is calculated already, where applicable. Manually the rotating speed can be adjusted as well when a variable speed drive is preferred.

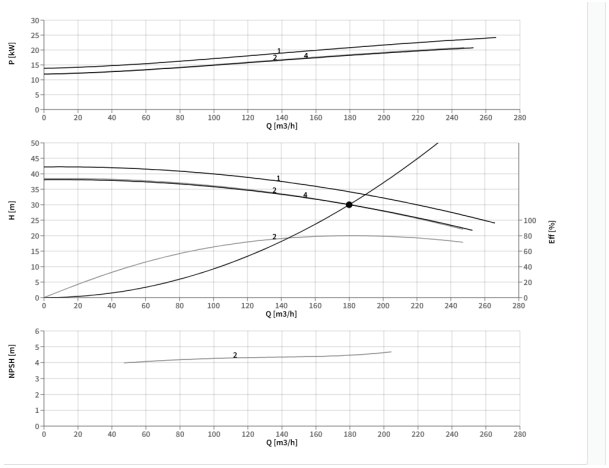
Example:

Curve 1: performance at maximum impeller diameter and 2900 rpm;

Curve 2: performance at required duty point (100 m^3/h, 30 m) with trimmed impeller, power consumption 11,12 kW;

Curve 4: performance at required duty point with maximum impeller diameter and reduced rotating speed (2814 rpm), power consumption 11,02 kW.

Figure 2: Hydraulic Investigator 3 (HI-3)



Duty Points	1	2	3	4	
Impeller Dia	175	168	168	175	mm
Q	189.6	180.1	180.1	180.1	m3/h
H	33.3	30	30	30	m
P	21.22	18.42	18.42	18.21	kW
NPSH req	4.5	4.5		4.2	m
Efficiency	80.9	79.9	79.9	80.9	%
Efficiency BEP	81	79.9	79.9	80.9	%
Q/Qbep	97.6	98.5	98.5	97.6	%
S Value	13126	13126	13126	13126	
MEI Value	> 0.40	> 0.40	> 0.40	> 0.40	
Spec.Speed ns	49.14	49.14	49.14	49.14	
Dia.BackVanes	175	168	168	175	mm
Kin.Viscosity	1	1	1	1	mm2/s[cSt
Dyn.Viscosity	1	1	1	1	mPa s [cP]
Density	1000	1000	1000	1000	kg/m3
Motor					
Speed	2960	2960	2960	2812	1/min
Max.Power	24.17	20.8		20.74	kW
Orifice	1	2	3	4	

2.7.4 Scope of Implementing Directive 2009/125/EC

The following SPX Flow Technology products are in the scope of the directive:

- CombiNorm (ESOB)
- CombiChem (ESOB)
- CombiBloc (ESCC)
- CombiBlocHorti (ESCC)
- CombiLine (ESCCi)
- CombiLineBloc (ESCCi)

Pumps with half-open impeller are excluded from the scope of the directive. Half-open impellers are designed for pumping liquids containing solids.

The vertical multistage pump range MCV(S) is out of the scope of the directive, these pumps are designed for pressures up to 4000 kPa (40 bar).

Submersible multistage pumps are not available in the SPXFLOW product portfolio.

2.7.5 Product information

Name plate, example:

Figure 3: Name plate

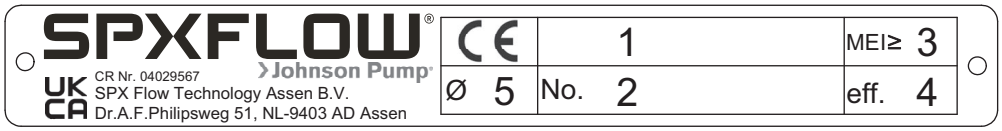


Table 2: Name plate

1	CLB 65-200 G1	Product type and size
2	19-001160	Year and serial number
3	0,40	Minimum Efficiency Index at max. impeller diameter
4	[xx.x]% or [-,-]%	Effciency for trimmed impeller diameter
5	202 mm	Fitted impeller diameter

Figure 4: Name plate ATEX certified

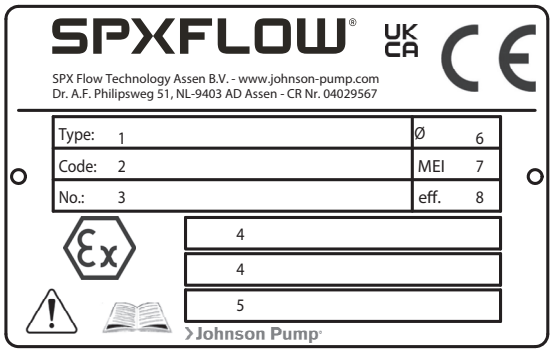


Table 3: Name plate ATEX certified

1	CLB 65-200	Product type and size
2	G1	Smartcode
3	19-001160	Year and serial number
4	II 2G Ex h IIC T3-T4 Gb	Ex marking part 1
4	-40°C≤Ta≤+60°C	Ex marking part 2
5	KEMA03 ATEX2384	Certificate number
6	202 mm	Fitted impeller diameter
7	0,40	Minimum Efficiency Index at max. impeller diameter
8	[xx.x]% or [-,-]%	Effciency for trimmed impeller diameter

1 Minimum efficiency index, MEI:

Table 4: MEI value

	Speed [rpm]	**MEI value according prEN16480**		**Remarks**
Material		**Cast iron**	**Bronze[1)]**	
40C-125	2900	> 0,40	> 0,40	
40-160	2900	> 0,40	> 0,40	
40-200	2900	> 0,40	> 0,40	
50-125	2900	> 0,40	> 0,40	
50-160	2900	> 0,40	> 0,40	
50-200	2900	> 0,40	> 0,40	
65-125	2900	> 0,40	> 0,40	
65-160	2900	> 0,40	> 0,40	
65-200	2900	> 0,40	> 0,40	
80-125	2900	> 0,40	> 0,40	
80-160	2900	> 0,40	> 0,40	
80-200	2900	> 0,40	> 0,40	
80A-250	1450	> 0,40	> 0,40	
100-160	1450	> 0,40	> 0,40	
100-200	2900	> 0,40	x	
100A-250	1450	> 0,40	x	
125-160	1450	> 0,40	> 0,40	
125C-200	1450	> 0,40	> 0,40	
125A-250	1450	> 0,40	> 0,40	
150-125	1450	---	---	Outside scope, ns > 80 rpm
150-160	1450	> 0,40	> 0,40	
150-200	1450	> 0,40	x	
150-250	1450	> 0,40	x	
200-160	1450	---	---	Outside scope, ns > 80 rpm
200-200	1450	> 0,40	x	

1) impeller or pump in bronze

x = not available in delivery program

2 The benchmark for most efficient water pumps is MEI ≥ 0,70.

3 Year of manufacture; the first 2 positions (= the last 2 positions of the year) of the serial number of the pump as marked on the rating plate. An example and explanation is given in paragraph 2.7.5 "Product information" of this document.

4 Manufacturer:

SPX Flow Technology Assen B.V.
Registration number at Chamber of Commerce 04 029567
Dr. A.F. Philipsweg 51
9403 AD Assen
The Netherlands

5 Product type and size identifier are marked on the rating plate. An example and explanation is given in paragraph 2.7.5 "Product information" of this document.

6 The hydraulic pump efficiency of the pump with trimmed impeller diameter is marked on the rating plate, either the efficiency value [xx.x]% or [-.-]%.

7 Pump curves, including efficiency characteristics, are published in the software program “Hydraulic Investigator 3 (HI-3)” from the SPXFLOW website. To access and use “Hydraulic Investigator 3 (HI-3)” go to https://hiapp.spxflow.com/. The pump curve for the delivered pump is part of the related customer order documentation package separate from this document.

8 The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.

9 The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system.

10 Information relevant for disassembly, recycling or disposal at end-of-life is described in paragraph 2.9 "Re-use", paragraph 2.10 "Scrapping" and chapter 7 "Disassembly and assembly".

11 The benchmark efficiency Fingerprint Graphs are published for:

MEI = 0,40	MEI = 0,70
ESOB 1450 rpm	ESOB 1450 rpm
ESOB 2900 rpm	ESOB 2900 rpm
ESCC 1450 rpm	ESCC 1450 rpm
ESCC 2900 rpm	ESCC 2900 rpm
ESCCi 1450 rpm	ESCCi 1450 rpm
ESCCi 2900 rpm	ESCCi 2900 rpm
Multistage Vertical 2900 rpm	Multistage Vertical 2900 rpm
Multistage Submersible 2900 rpm	Multistage Submersible 2900 rpm

Benchmark efficiency graphs are available under http:\\www.europump.org/efficiencycharts.

2.8 Application area

Table 5: Application area.

Maximum capacity	450 m^3/h
Maximum head	100 m
Maximum temperature	120 °C (peak values of 140 °C)
Maximum operating pressure	6 bar (ND6)/10 bar (ND10)
Maximum speed	50 Hz: 3000 min^{-1}/ 1500 min^{-1}
	60 Hz: 3600 min^{-1}/ 1800 min^{-1}

2.9 Re-use

The pump may only be used for other applications after prior consultation with SPXFLOW or your supplier. Since the lastly pumped medium is not always known, the following instructions should be observed:

1 flush the pump properly.

2 make sure the flushing liquid is discharged safely (environment!)

⚠ ***Take adequate precautions and use the appropriate personal protection means like rubber gloves and spectacles!***

2.10 Scrapping

If it has been decided to scrap a pump, the same flushing procedure as described for Re-use should be followed.

3 Installation

3.1 Safety

- Read this manual carefully prior to installation and commissioning. Non-observance of these instructions can result in serious damage to the pump and this will not be covered under the terms of our guarantee. Follow the instructions given step by step.
- The area in which the pump unit is to be placed should be adequately ventilated. A too high ambient temperature and air humidity, as well as a dusty environment may have a negative effect on the functioning of the electric motor.
- The cooling air inlet of the motor should be positioned in such a way that unobstructed air supply is ensured.
- Make sure that the system pressure is always below the maximum allowable operational pressure. For exact values see paragraph 2.8 "Application area".
- If the pumped liquid is harmful to men or the environment, take appropriate measures to drain the pump safely. Possible leakage liquid from the mechanical seal should also be discharged safely.
- Depending on the design the pumps are suitable for liquids with a temperature of up to 140°C. When installing the pump unit to work at 65°C and above the user should ensure that appropriate protection measures and warnings are fitted to prevent contact with the hot pump parts.

3.2 Preservation

In order to prevent corrosion, the inside of the pump is treated with a preserving agent before leaving the factory.

Before commissioning the pump remove any preserving agents and flush the pump thoroughly with hot water.

3.3 Accessories

- In case the pump is provided with an isolation, special attention has to be paid To temperature limits of shaft seal and bearing.

3.4 Environment

- The area in which the pump is installed must be sufficiently ventilated. An ambient temperature or air humidity which is too high, or a dusty environment, can have a detrimental effect on the operation of the electric motor.
- There should be sufficient space around the pump unit to operate and if necessary repair it.
- Behind the cooling air inlet of the motor there must be a free area of at least ¼ of the electric motor diameter, to ensure unobstructed air supply.

3.5 Piping

As regards the piping and connecting points of the pump attention should be paid to the following:

- Preferably the pump should be mounted in the piping in such a way that the direction of flow is vertical, so as to prevent air from remaining in the pump. Air in the pump may cause damage to the mechanical seal!
- Make sure that the system has one or more draining apertures. Also, it should be possible to bleed or de-aerate the system, preferably directly above the pump.
- If necessary mount valves before and after the pump. Do not use quick-acting valves, as they may cause high pressure impulses in the pump and the piping (water hammer pressure).
- Before installing the pump, all piping should be flushed, to eliminate all dirt, grease or possible other particles.

3.6 Installation

The pump can be mounted in both horizontal and vertical piping.

If the pump is provided with an electric motor B3/B5 or B5 the electric motor must be mounted in horizontal position.

If the pump is provided with an electric motor V1 the electric motor must be mounted in vertical position.

When installing the pump, proceed as follows:

1 Make sure the piping is supported before and after the pump (brackets).

2 The arrow on the pump casing shows the exact position of the suction and delivery flange.

3 Check the position of the terminal box on the electric motor in relation to the position of the pump in the piping. If this position is not correct, the electric motor should be rotated.

4 Mount the flange gaskets and place the pump between the flanges of the piping.

5 Insert the fastening bolts and nuts and tighten them crosswise.

3.7 Connecting the electric motor

⚠ ***The electric motor must be connected to the mains by an approved electrician, according to the locally prevailing regulations of the electricity company.***

- Refer to the instruction manual belonging to the electric motor.
- If possible, mount a working switch as close as possible to the pump.

4 Commissioning

4.1 Inspection of the pump

- Check whether the pump shaft turns freely. Do this by turning the stub shaft a few times by hand.

4.2 Inspection of the motor

- Check whether the fuses have been mounted.

4.3 Preparing the pump unit for commissioning

Proceed as follows, both when the unit is put into operation for the first time and after the pump has been overhauled:

1 Open the valves.

! **If there still is hot water in the pipes, open the valves gradually to prevent pressure impulses or sudden changes of temperature, which would cause serious damage to the pump.**

2 Fill the system with liquid until the correct pressure is reached.

3 Bleed the system.

4 Check the sense of rotation. See chapter 4.4 "Checking the sense of rotation".

5 Start the pump.

4.4 Checking the sense of rotation

⚠ ***Beware of possible non-screened rotating parts, when checking the sense of rotation!***

1 The sense of rotation of the pump is indicated by an arrow. Check whether the sense of rotation of the motor corresponds with that of the pump.

2 Let the motor run for only a short time and check the sense of rotation.

3 If the sense of rotation is **not** correct, alter the sense of rotation. See the instructions in the user manual belonging to the electric motor.

4 Fit the guards.

⚠ ***Make sure that when a pump is running, rotating parts are always properly screened by the guards!***

4.5 Pump in operation

When the pump is in operation, pay attention to the following:

- The pump should never run dry.
- Never use a stop valve in the suction line to control pump output. The stop valve should always be fully opened during operation.
- Check whether the absolute inlet pressure is sufficient, to prevent vaporization in the pump. Vaporization may cause cavitation.

! Cavitation should always be prevented since it causes serious damage to the pump!

- Check whether the pressure difference between suction and delivery side corresponds with the specifications of the pump's duty point.
- A mechanical seal may never show visible leakage.

4.6 Noise

The noise production of a pump depends to a great extent on the operating conditions. The values stated in paragraph 10.4 "Noise data" are based on normal operation of the pump, driven by an electric motor. In case the pump is driven by a combustion engine, or in case it is used outside the normal operation area, as well as in case of cavitation, the noise level may exceed 85 dB(A). In that case precautions should be taken, like building a noise-barrier around the unit or wearing hearing protection.

5 Maintenance

5.1 Daily maintenance

Regularly check the outlet pressure.

⚠ ***No water should get into the terminal box of the electric motor when the pump room is sprayed clean!***

⚠ ***Never spray water on hot pump parts! The sudden cooling down may cause them to burst and hot water may flow out!***

! **Flawed maintenance will result in shorter lifespan, possible break down and in any event loss of warranty.**

5.2 Mechanical seal

A mechanical seal generally requires no maintenance, however, **it should never be allowed to run dry.** If there are no problems, do not dismantle the mechanical seal. As the seal faces have run in on one another dismantling usually implicates replacement of the mechanical seal. If a mechanical seal shows any leakage it has to be replaced.

5.3 Lubrication of the bearings

For maintenance of the motor bearings we refer to the instructions of the motor supplier concerned.

5.4 Environmental influences

- When a unit is out of operation and there is a risk of freezing, it is recommended to drain the unit.
- If the pump is out of service for a long time, it has to be preserved.
- Check motor for accumulation of dust or dirt, which might influence motor temperature.

5.5 Noise

If a pump starts making excessive noise, this may point to certain problems with the pump unit. A crackling noise can indicate cavitation or excessive motor noise can indicate deterioration of the bearings.

5.6 Motor

Check motor specifications for start-stop frequency.

5.7 Faults

1 If the pump shows problems, the cause may be elsewhere in the system. First check whether this is the case.

2 If you are sure the problem is within the pump, try to determine the cause. See chapter 6 "Problem solving". Then take the necessary measures.

3 See chapter 7 "Disassembly and assembly" in case repair is necessary.

⚠ ***Always switch off the pump and close the valves before trying to determine a failure!***

! **First of all try to find what caused the failure. In case of electric failure, the cause may be in the cabling. In that case consult a approved electrician!**

6 Problem solving

Faults in a pump installation can have various causes. The fault may not be in the pump, it may also be caused by the pipe system or the operating conditions. Firstly, always check that installation has been executed in accordance with the instructions in this manual and that the operating conditions still correspond with the specifications for which the pump was purchased.

In general, breakdowns in a pump installation are attributable to the following causes:

- Faults with the pump.
- Breakdowns or faults in the pipe system.
- Faults due to incorrect installation or commissioning.
- Faults due to incorrect choice of pump.

A number of the most frequently occurring failures as well as their possible causes are shown in the table below.

Table 6: Most frequently occurring failures.

Most common faults	**Possible causes, see Table 7.**
Pump delivers no liquid	1 2 3 4 8 9 10 11 13 14 17 19 20 21 29
Pump has insufficient volume flow	1 2 3 4 8 9 10 11 13 14 15 17 19 20 21 28 29
Pump has insufficient head	2 4 13 14 17
Pump stops after start up	1 2 3 4 8 9 10 11
Pump has higher power consumption than normal	12 15 16 17 18 22 24 25 26 27 32 38 39
Pump has lower power consumption than normal	13 14 15 16 17 18 20 21 28 29
Mechanical seal has to be replaced to often	25 26 30 32 33 36
Pump vibrates or is noisy	1 9 10 11 15 18 19 20 22 24 25 26 27 29 37 38 39 40
Bearings wear too much or become hot	24 25 26 27 37 38 39 40 42
Pump running rough, hot or seizes	24 25 26 27 37 38 39 40 42

Table 7: Possible causes of pump failures.

	Possible causes
1	Pump or suction pipe is not sufficiently filled or de-aerated
2	Gas or air coming from the liquid
3	Air lock in the suction pipe
4	Air leak in the suction pipe
8	The manometric suction head is too high
9	Suction pipe or suction strainer is blocked
10	Insufficient immersion of foot valve or suction pipe during operation of the pump
11	NPSH available too low
12	Speed too high
13	Speed too low
14	Wrong sense of rotation
15	Pump does not operate at the right duty point
16	Liquid density differs from the calculated liquid density
17	Liquid viscosity differs from the calculated liquid viscosity
18	Pump operates when the liquid flow is too low
19	Wrong pump selection
20	Obstruction in impeller or pump casing
21	Obstruction in the piping
22	Wrong installation of the pump unit
24	Rotating part running out of true
25	Imbalance in rotating parts (for instance: impeller or stub shaft)
26	Stub shaft is running out of true
27	Bearings faulty or worn out
29	Damaged impeller
30	Seal faces of the mechanical seal are worn out or damaged
32	Bad mounting of the mechanical seal
33	Mechanical seal not suitable for the pumped liquid or operation circumstances
36	Flushing liquid to the mechanical seal is polluted
37	Axial retaining of impeller or stub shaft is defective
40	Wrong or polluted lubricant
42	Too high axial force because of worn dorsal blades or excessive inlet pressure

7 Disassembly and assembly

7.1 Precautions

Before the pump can be repaired it first has to be removed from the system. Take the following steps:

7.1.1 Switch off the electricity supply

1 Disconnect the electricity supply to the pump by setting the pump switch on the switchboard or, if available, the operation switch, to "**O**".

2 Remove the fuses.

3 Place a warning plate at the switchboard cabinet.

7.1.2 Disconnecting the electricity supply

⚠ ***Make sure that the electricity supply to the pump has been switched off and that the pump cannot be switched on by others!***

1 Open the cover of the terminal box on the motor.

2 Loosen the supply wires. Mark the wires and the corresponding terminals for later reconnection.

7.1.3 Support of the piping

If the entire pump has to be removed, you have to make sure that the piping is properly supported. If this is not so, you should first support and bracket the piping.

7.1.4 Liquid draining

1 Close all valves wherever necessary.

2 A pump that is used for heating should be left to cool down first.

3 Drain the system to the extent that there is no liquid left in the pump.

⚠ ***Be careful not to touch the liquid, it may still be hot!***

7.2 Removing the pump

7.2.1 Back-Pull-Out system

The pump is designed with a Back-Pull-Out system. This means that in case of repairs, the pump casing does not have to be removed from the piping (unless the fault is in the pump casing itself).

For maintenance and repairs usually it is not necessary to remove the whole pump from the piping. You only have to remove the integrated pump cover/motor-part, the so called 'Back-Pull-Out unit'. To do this, follow the instructions from paragraph 7.3.1 "Disassembling the Back-Pull-Out unit".

7.3 Disassembly

7.3.1 Disassembling the Back-Pull-Out unit

! NEVER start dismantling by loosening the motor bolts (0850) and nuts (0900). This may result in irrepairable damage to the mechanical seal and the impeller!

1 Loosen the fastening nuts (0810) of the lantern piece, see figure 5.
If the pump is still in the piping, start from the bottom side and proceed along the two sides upward, see figure 6.

2 Pull the motor together with the entire lantern piece out of the pump casing. The Back-Pull-Out unit large pumps is very heavy. Support it with a beam or hang it in a pulley sling.!

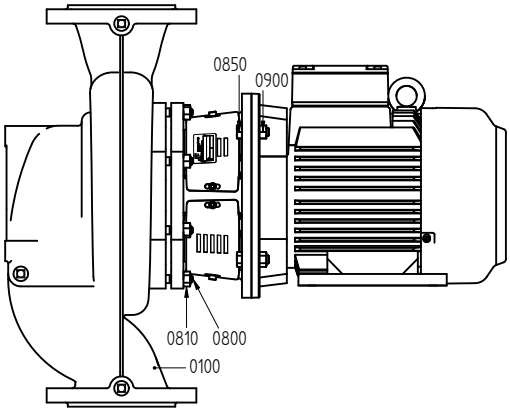


Figure 5: Disassembling the Back-Pull-Out unit.

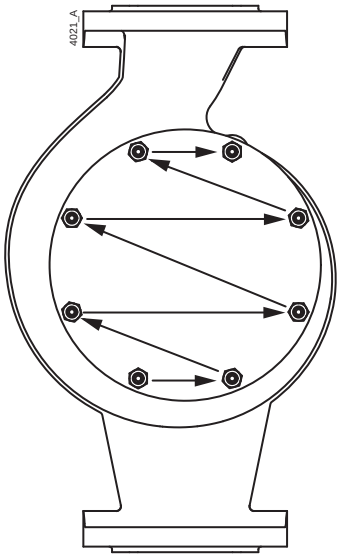


Figure 6: Sequence of loosening the lantern piece fastening nuts.

7.3.2 Assembling the Back-Pull-Out unit

1 Grease the outer edge of the impeller entry with Molycote 107.

2 Fit the O-ring (0300) or a **new** gasket (0300).

3 Mount the complete lantern piece with motor back into the pump casing.

4 Fit the nuts (0810) and tighten them crosswise with the proper tightening torque. See paragraph 10.2.1 "Tightening moments for bolts and nuts".

7.4 Impeller

7.4.1 Disassembling the impeller

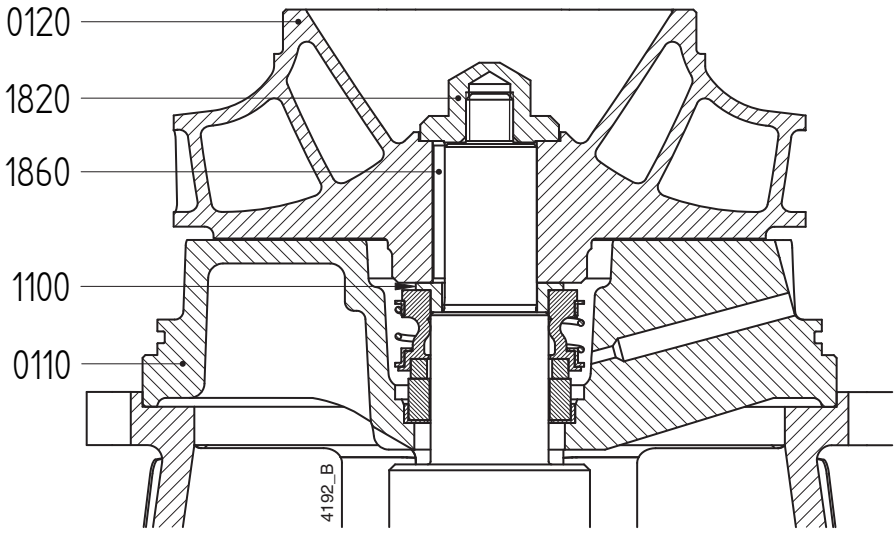


Figure 7: Disassembling the impeller.

The item numbers used are referring to figure 7.

1 Remove the Back-Pull-Out unit, see paragraph 7.3.1 "Disassembling the Back-Pull-Out unit".

2 Block the impeller (0120) against rotating, see figure 8.

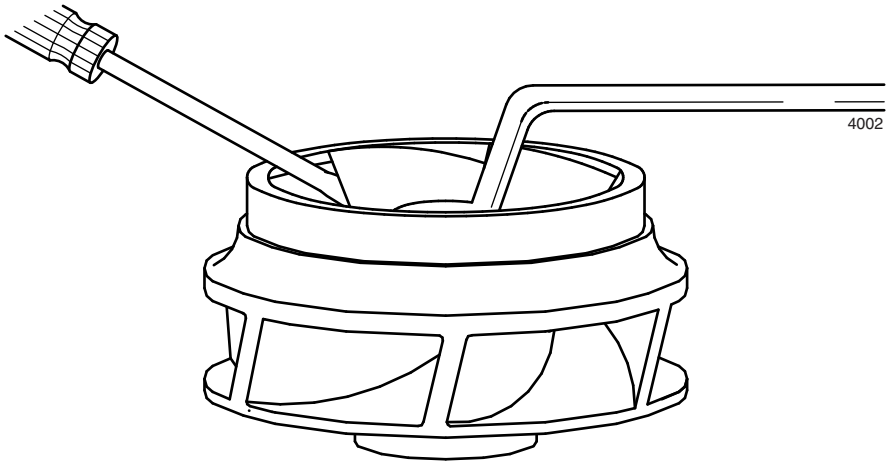


Figure 8: Loosening the impeller nut.

3 Remove the cap nut (1820). Sometimes the nut has to be heated to break the Loctite-contact.

4 Remove the impeller (0120) with a pulley puller, or wrest the impeller by inserting for instance 2 big screwdrivers between the impeller and the pump cover (0110).

5 Remove the impeller key (1860).

6 Remove the distance sleeve (1100) with the rotating part of the mechanical seal (1220).

7 Pump size 200-160 only: Loosen the set screws (1260). Remove the shaft sleeve (1200) and the rotating part of the mechanical seal (1220).

7.4.2 Mounting the impeller

200-160 only:

1 Fit the rotating part of the mechanical seal on the stub shaft.

2 Fit the shaft sleeve (1200) and set the distance to the shaft collar to 44 mm. See figure 11 of paragraph 7.5.3 "Assembling a mechanical seal M1". Tighten the set screws (1260).

Other types:

1 Fit the rotating part of the mechanical seal on the distance sleeve.

2 Fit the distance sleeve with the rotating part of the mechanical seal on the stub shaft.

All types:

1 Place the impeller key in the key way of the stub shaft.

2 Push the impeller onto the stub shaft against the distance sleeve.

3 Degrease the thread on the stub shaft and the thread in the cap nut.

4 Put a drop of Loctite 243 on the thread and fit the cap nut. For tightening moment of the nut see paragraph 10.2.2 "Tightening moments for cap nut".

5 Mount the Back-Pull-Out unit, see paragraph 7.3.2 "Assembling the Back-Pull-Out unit".

7.5 Mechanical seal

7.5.1 Instructions for mounting a mechanical seal

➢ *First read the following instructions regarding the mounting of a mechanical seal. Follow these instructions closely when mounting a mechanical seal.*

- **Leave the assembly of a mechanical seal with PTFE (Teflon) covered O-rings to a specialist.** These rings are easily damaged during assembly.
- A mechanical seal is a fragile precision instrument. Leave the seal in its original packing until you are ready to fit it!
- Clean all receiving parts properly. Make sure your hands and working environment are clean!
- **Never touch the sliding surfaces with ones fingers!**
- Take care not to damage the seal during assembly. Never put the rings down on their sliding surfaces!

➢ *Special tools: Mounting the mechanical seal unit is easier when you use a special tapered mounting bush. That way, the sharp shaft edges are covered so that the risk of damaging the seal during assembly is reduced. See figure 9.*

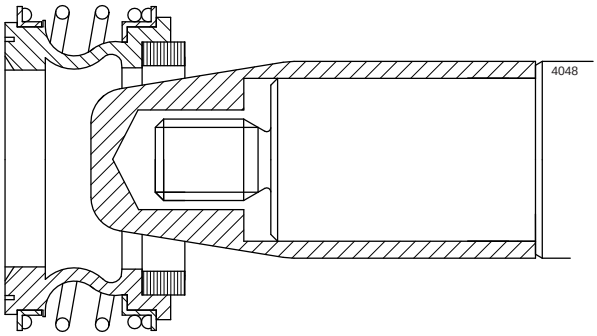


Figure 9: Special mounting bush.

7.5.2 Disassembling a mechanical seal M1

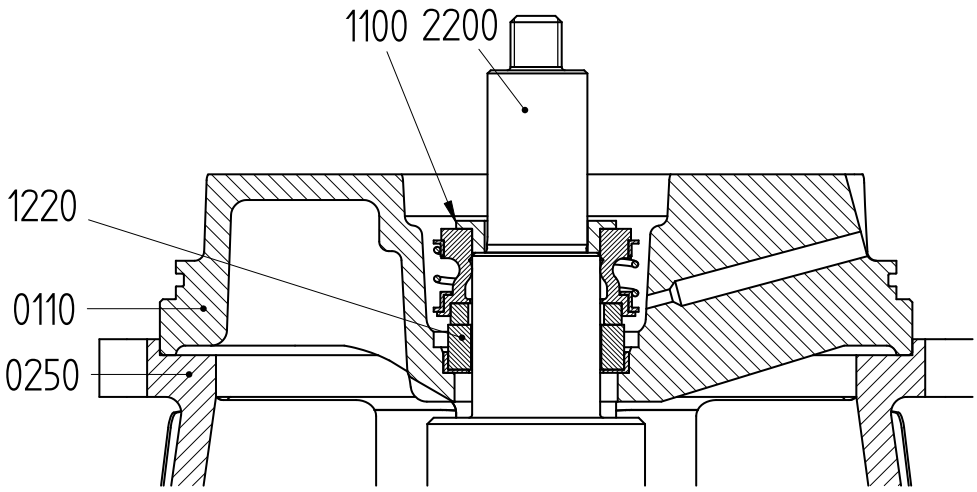


Figure 10: Mechanical seal M1.

The item numbers used are referring to figure 10.

1 Remove the impeller, see paragraph 7.4.1 "Disassembling the impeller".

2 Pump size 200-160 only: Loosen the set screws (1260). See figure 11.

3 Pull the distance sleeve (1100) (Pump size 200-160: spacer sleeve (1200)) and the rotating part of the mechanical seal (1220) off the shaft.

4 Mark the position of the pump cover (0110) in relation to the lantern piece (0250). Knock the pump cover loose and remove it.

5 Push the counter-ring of the mechanical seal (1220) out of the pump cover.

7.5.3 Assembling a mechanical seal M1

1 Make sure the stub shaft (2200) is not damaged. If it is, replace it.

2 Place the electric motor with the shaft upright.

3 Put the pump cover flat down and press the counter-ring of the seal straight into it. If necessary, use a plastic pressure piece. **Never hammer it inside!** The maximum axial turn of the counter-ring is 0,1 mm.

4 Mount the pump cover in the right position in the collar of the lantern piece. Check whether the pump cover is at right angles to the stub shaft.

5 Push the rotating part of the mechanical seal on the distance sleeve (1100). **Put some glycerine or silicon spray on the bellows to facilitate the assembly!**

6 Pump size 200-160 only: Push the rotating part of the mechanical seal and the spacer sleeve (1200) on the the stub shaft.

7 Pump size 200-160 only: Set the distance between the spacer sleeve and the shaft collar at **44 mm**. Fix the spacer sleeve by means of set screw (1260). See figure 11.

8 Mount the impeller, see paragraph 7.4.2 "Mounting the impeller".

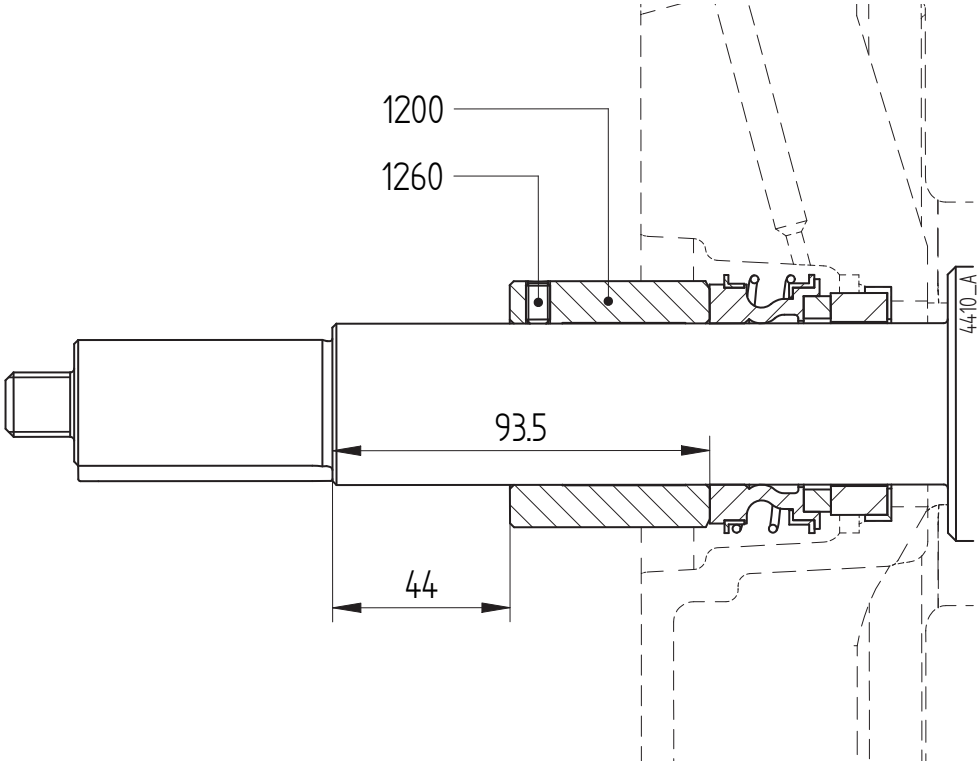


Figure 11: Adjusting the mechanical seal M1 of pump size 200-160.

7.6 Replacing the stub shaft and the motor

7.6.1 Disassembling the stub shaft and the motor

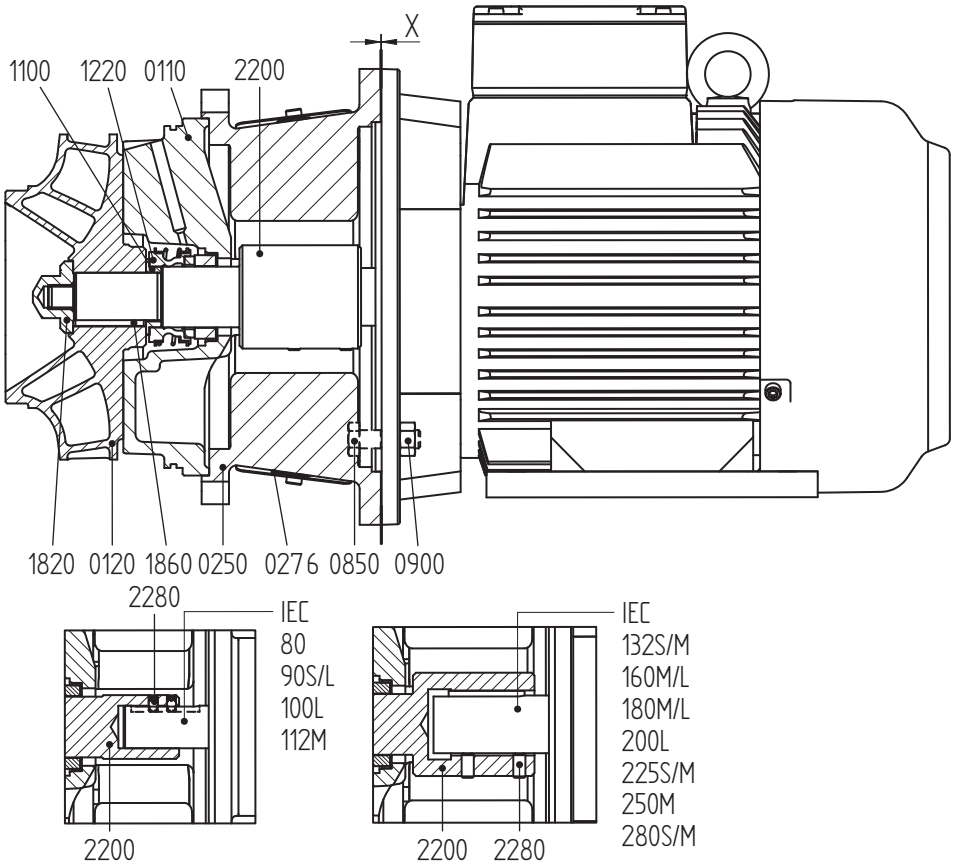


Figure 12: Assembly of the stub shaft

The item numbers used are referring to figure 12.

1 Dismantle the impeller and the shaft seal. See paragraph 7.4.1 "Disassembling the impeller" and paragraph 7.5.2 "Disassembling a mechanical seal M1".

2 Loosen the bolts (0850) and nuts (0900) and remove the lantern piece (0250) from the motor.

3 Remove the seal guards (0276).

4 Loosen the set screws (2280) and pull the stub shaft (2200) from the motor shaft.

7.6.2 Assembling the stub shaft and the motor

1 For electric motors with IEC-size 80 upto and including 112M: Remove the key (2210) from the motor shaft.

2 Put the motor in vertical position, shaft end up. Fit the stub shaft (2200) on the motor shaft. **Do not fix the stub shaft yet!**

3 For electric motors with IEC size 80 upto and including 112M: make sure the set screws (2280) are positioned over the key way in the motor shaft.

4 Place shims of **0,5 mm** thickness between the lantern piece and the motor flange and fit the lantern piece (0250) to the electric motor.

5 Mount the pump cover (0110), the mechanical seal (1200) and the impeller (0120).

6 Push the impeller on the stub shaft until the back blades touch the pump cover.

7 Fix the stub shaft on the motor shaft with the set screws (2280).

8 Slightly loosen the fastening bolts (0850) of the electric motor and remove the shims.

9 Tighten the fastening bolts (0850) of the electric motor crossways with the prescribed tightening moment, see paragraph 10.2.1 "Tightening moments for bolts and nuts".

10 Fit the O-ring (0300) or a **new** gasket (0300) and fit the pump casing (0100). Fix the pump casing with nuts (0810). Tighten them crossways. See paragraph 10.2.1 "Tightening moments for bolts and nuts".

11 Fit the seal guards (0276).

8 Dimensions

8.1 Dimensions drawings

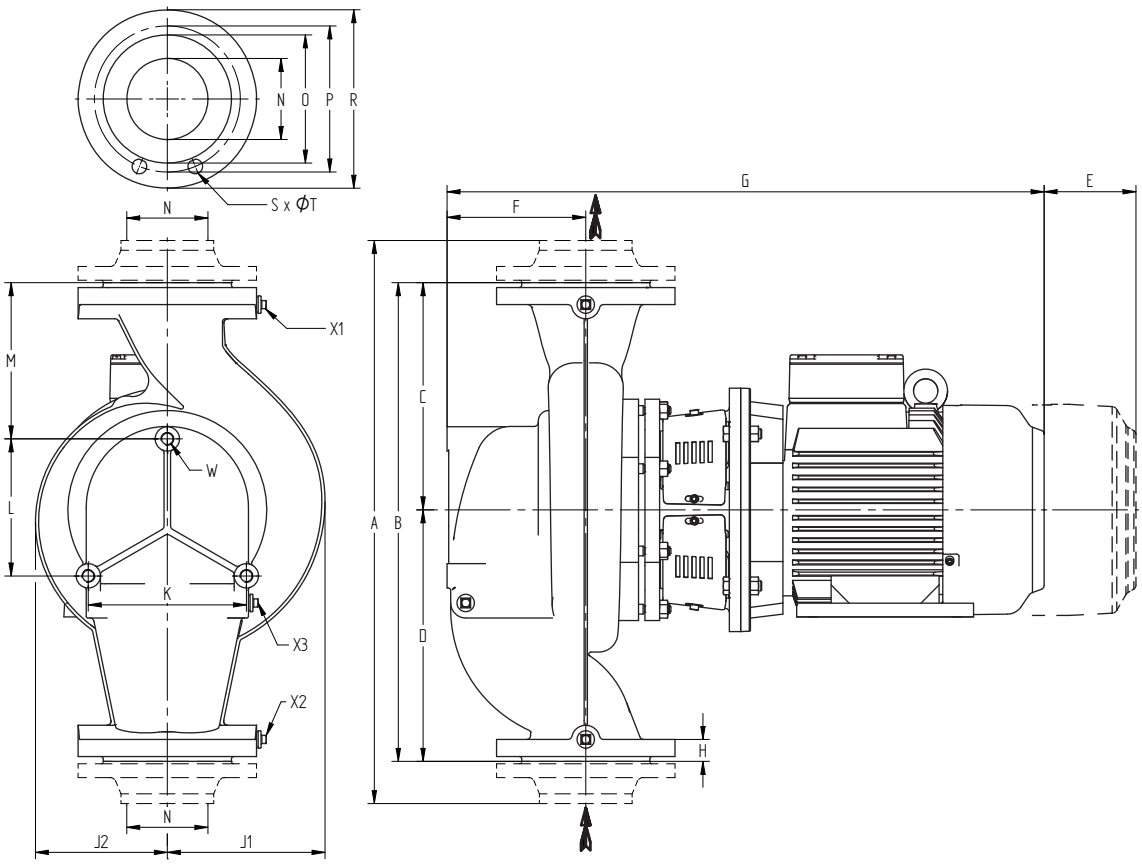


Figure 13: Pump dimensions drawing.

8.2 Pump dimensions

See figure 13.

CLB	N	A	B	C	D	E	F	H ND6	H ND10	J1	J2	K	L	M	W	X1[2] X2[2]	X3[2]
40C-125	40	345	250	125	125	100	79	20	20	96	85	92	85	75,5	M16	G1/4	G1/8
40-160	40	415	320	160	160	100	77	20	20	114	105	91	72,5	118,5	M16	G1/4	G1/8
40-200	40	455	360	180	180	100	77	20	20	138	129	93,5	105	124	M16	G1/4	G1/8
50-125	50	382	280	140	140	100	86	22	22	108	89	105	76,5	99	M16	G1/4	G1/8
50-160	50	442	340	170	170	100	88	22	22,5	120	107	107,5	85	127,5	M16	G1/4	G1/8
50-200	50	482	380	190	190	100	86	22	22,5	137	127	107	108,5	138,5	M16	G1/4	G1/8
65-125	65	436	340	170	170	100	115	22	22	120	100	127,5	101	121	M16	G3/8	G1/8
65-160	65	436	340	170	170	100	107	22	22	150	134	124	88,5	128,5	M16	G3/8	G1/8
65-200[1]	65	530	440	220	220	100	134	--	21	135	113	133,5	102,5	169,5	M16	G3/8	G3/8
80-125	80	466	360	180	180	100	130	24	24	143	109	143	124	118,5	M16	G3/8	G3/8
80-160	80	506	400	200	200	100	131	24	24,5	147	123	146,5	127	136,5	M16	G3/8	G3/8
80-200[1]	80	574	530	265	265	140	113	--	22	166	140	151	139	192	M16	G3/8	G3/8
100-160	100	600	560	260	300	140	188	27	27	190	141	184,5	170	172,5	M16	G3/8	G3/8
100-200	100	630	590	280	310	140	174	27	27	195	163	195	169	192,5	M16	G3/8	G3/8
80A-250	100	630	590	280	310	140	214,5	--	27	200	176	195	169	175	M16	G3/8	G3/8
125-160[1]	125	794	750	375	375	140	247	--	26	189	150	225	195	280	M16	G3/8	G3/8
125C-200	125	794	750	375	375	140	247	--	26	219	174	225	195	280	M16	G3/8	G3/8
100A-250	125	774	730	355	375	140	224,5	--	28,5	237	202	225	195	241	M16	G3/8	G3/8
150-125	150	966	850	400	450	140	287	--	28,5	294	218	320	257,5	255	M20	G3/8	G3/8
150-160	150	866	750	315	435	100	290	--	28,5	257	200	310	230	175	M20	G3/8	G3/8
150-200	150	836	720	315	405	140	245	--	24,5	245	198	258	198,5	214	M20	G3/8	G3/8
125A-250	150	921	805	355	450	140	282,5	--	28,5	261	216	310	254	212	M16	G3/8	G3/8
150-250	150	966	850	400	450	140	283	--	28,5	279	227	320	257,5	255	M20	G3/8	G3/8
200-160	200	1030	900	400	500	200	332	--	26,5	316	239	300	255	268	M20	G3/8	G3/8
200-200	200	1030	900	400	500	190	337	--	26,5	297	237	298	230,5	280	M20	G3/8	G3/8

[1] Cam 90 degree rotated on flange

[2] Only ND10

8.3 Overall length (G)

Motor	80	90S/L	100L/112M	132S/M	160M/L	180M/L	200L	225S/M	250M	280S/M
CLB	G (*)									
40C-125	519	565	635	-	-	-	-	-	-	-
40-160	516	562	632	710	-	-	-	-	-	-
40-200	516	562	632	710	838	-	-	-	-	-
50-125	526	572	642	720	848	-	-	-	-	-
50-160	530	576	646	724	852	-	-	-	-	-
50-200	528	574	644	722	850	-	-	-	-	-
65-125	557	603	673	751	879	-	-	-	-	-
65-160	549	595	665	743	871	-	-	-	-	-
65-200	566	612	682	760	932	966	1094	-	-	-
80-125	577	623	693	771	899	-	-	-	-	-
80-160	588	634	704	782	954	988	1116	-	-	-
80-200	549	595	665	743	915	949	1077	-	-	-
100-160	-	683	753	831	1003	1037	1165	-	-	-
100-200	-	667	737	853	987	1057	1149	1217	1425	1585
80A-250	-	712	782	898	1032	-	-	-	-	-
125-160	-	748	818	896	1068	1102	1230	-	-	-
125C-200	-	748	818	934	1068	1102	1230	1298	1506	1666
100A-250	-	-	796	912	1046	1116	-	-	-	-
150-125	-	-	860	938	-	-	-	-	-	-
150-160	-	-	866	982	1116	-	-	-	-	-
150-200	-	-	825	941	1031	-	-	-	-	-
125A-250	-	-	854	970	1104	1174	-	-	-	-
150-250	-	-	-	986	1120	1190	1302	1350	-	-
200-160	-	-	931	1047	1137	1207	-	-	-	-
200-200	-	-	-	986	1109	1155	1289	-	-	-

(*): Motor length based on DIN 42677, could be different due to applied motor make.

8.4 Weight

	Weight [kg] excluding motor									
	Motor									
CLB	80	90 S/L	100L/ 112M	132 S/M	160 M/L	180 M/L	200 L	225 S/M	250 M	280 S/M
40C-125	22	22	23	-	-	-	-	-	-	-
40-160	28	28	29	32	-	-	-	-	-	-
40-200	36	36	36	39	42	-	-	-	-	-
50-125	24	24	25	28	-	-	-	-	-	-
50-160	31	31	32	34	38	-	-	-	-	-
50-200	37	37	38	40	44	-	-	-	-	-
65-125	29	29	30	33	-	-	-	-	-	-
65-160	33	33	34	36	40	-	-	-	-	-
65-200	44	44	45	47	51	51	52	-	-	-
80-125	36	36	37	40	42	-	-	-	-	-
80-160	42	42	43	46	49	50	55	-	-	-
80-200	58	58	59	61	65	65	66	-	-	-
100-160	-	65	66	69	72	73	78	-	-	-
100-200	-	-	68	70	74	74	75	76	89	89
80A-250	-	88	86	89	92	-	-	-	-	-
125-160	-	90	91	93	97	97	98	-	-	-
125C-200	-	92	93	95	98	99	100	101	114	114
100A-250	-	-	118	121	124	125	-	-	-	-
150-125	-	160	161	164	-	-	-	-	-	-
150-160	-	-	147	149	153	-	-	-	-	-
150-200	-	-	110	112	115	-	-	-	-	-
125A-250	-	-	149	151	155	155	-	-	-	-
150-250	-	-	-	203	206	206	211	225	-	-
200-160	-	-	198	200	205	205	-	-	-	-
200-200	-	-	197	200	203	204	208	-	-	-

8.5 Flange dimensions

See figure 13.

EN 1092-2 (DIN2531) PN 6 and ISO 7005				
N	**O**	**P**	**R**	**S x T**
32	78	90	140	4 x 14
40	80	100	130	4 x 14
50	90	110	140	4 x 14
65	110	130	160	4 x 14
80	128	150	190	4 x 18
100	148	170	210	4 x 18

EN 1092-2 (DIN2532) PN 10 and ISO 7005				
N	**O**	**P**	**R**	**S x T**
32	78	100	140	4 x 18
40	88	110	150	4 x 18
50	102	125	165	4 x 18
65	122	145	185	4 x 18
80	138	160	200	8 x 18
100	158	180	220	8 x 18
125	188	210	250	8 x 18
150	212	240	285	8 x 18
200	268	295	340	8 x 22

8.6 Base plate dimensions

See figure 14.

CLB	U1	U2	U3
40C-125, 40-160, 40-200, 50-125, 50-160, 50-200	35	200	155
65-125, 65-160, 65-200, 80-125, 80-160, 80-200	35	235	185
80-250A, 100-160, 100-200,125-160, 125C-200, 125A-250	35	300	240
100A-250, 150-125, 150-160, 150-200, 150-250, 200-160, 200-200	35	440	370

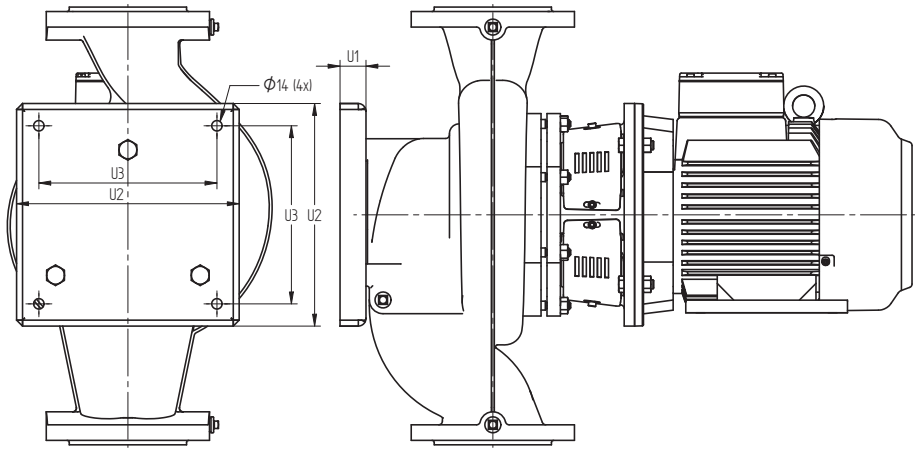


Figure 14: Base plate dimensions.

9 Parts

9.1 Ordering parts

9.1.1 Order form

You can use the order form included in this manual for ordering parts.

When ordering parts always quote the following data:

1 Your **address**.

2 The **quantity, the item number and the description** of the part.

3 The **pump number**. The pump number is stated on the label on the cover of this manual and on the type plate of the pump.

4 In the event of different electric motor voltage you should state the correct voltage.

9.1.2 Recommended spare parts

Parts marked with a * are recommended spare parts.

9.2 CLB parts

9.2.1 Sectional drawing

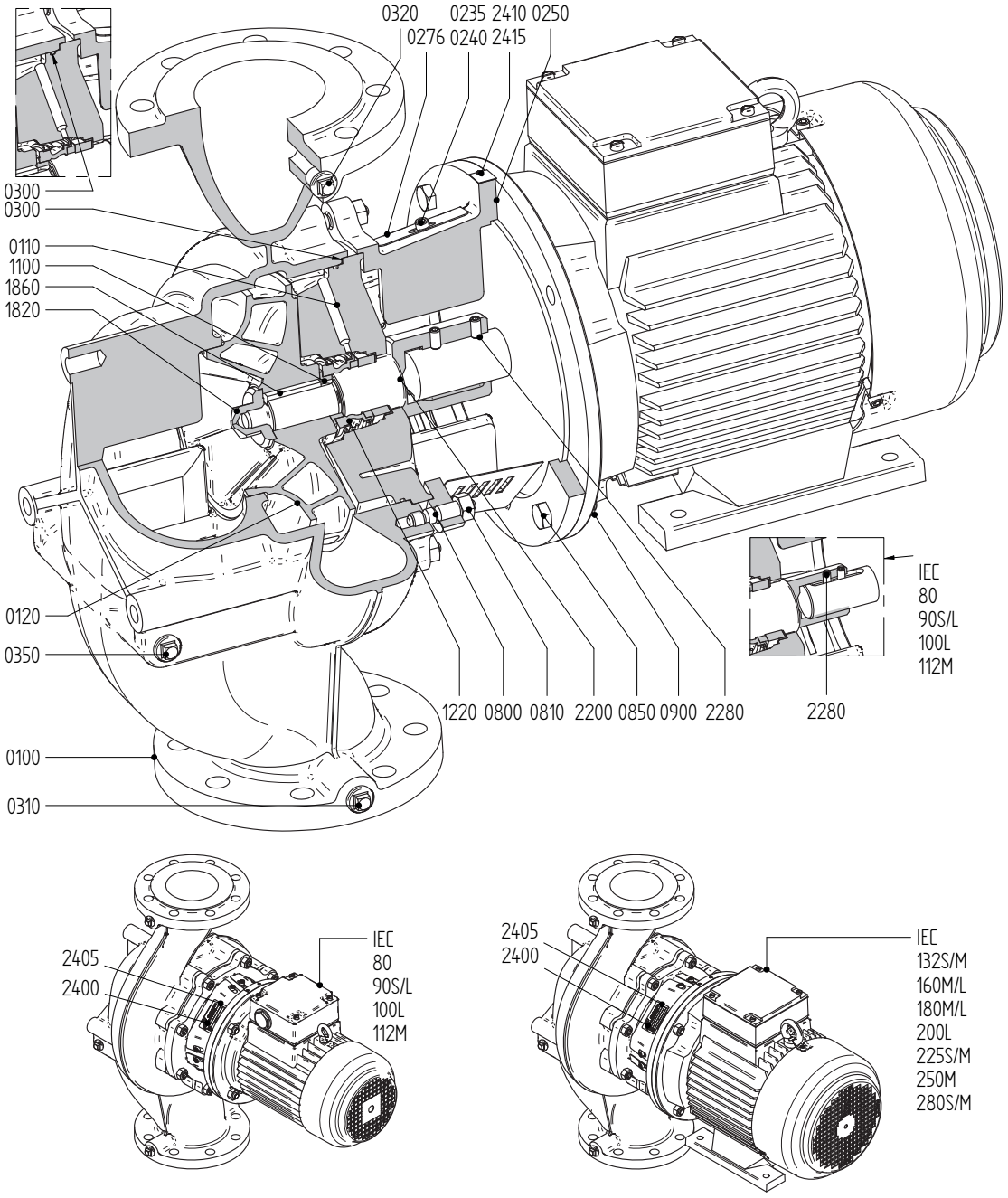


Figure 15: Sectional drawing.

9.2.2 Parts list

Item	Quantity	Description	Materials		
			G1	G2	B2
0100	1	pump casing	cast iron		bronze
0110	1	pump cover	cast iron		bronze
0120*	1	impeller	cast iron	bronze	bronze
0235	8	bolt	stainless steel		
0240	8	washer	stainless steel		
0250	1	lantern piece	cast iron		
0276	4	seal guard	stainless steel		
0300*	1	gasket or O-ring	- -		
0310	1	plug	steel		stainless steel
0320	1	plug	steel		stainless steel
0350	1	plug	steel		stainless steel
0800	4/8/12 *)	stud	steel		stainless steel
0810	4/8/12 *)	nut	steel		stainless steel
0850	4/8 **)	bolt	steel		
0900	4/8 **)	nut	steel		
1100	1	distance sleeve	stainless steel		
1220*	1	mechanical seal	- -		
1820*	1	cap nut	stainless steel		
1860*	1	impeller key	stainless steel		
2200*	1	stub shaft	stainless steel		
2280*	2	set screw	stainless steel		
2400	1	name plate	stainless steel		
2405	2	rivet	stainless steel		
2410	1	arrow plate	aluminium		
2415	2	rivet	stainless steel		

*) Quantity depending on pump type

**) Quantity depending on motor type

9.3 Additional parts 200-160

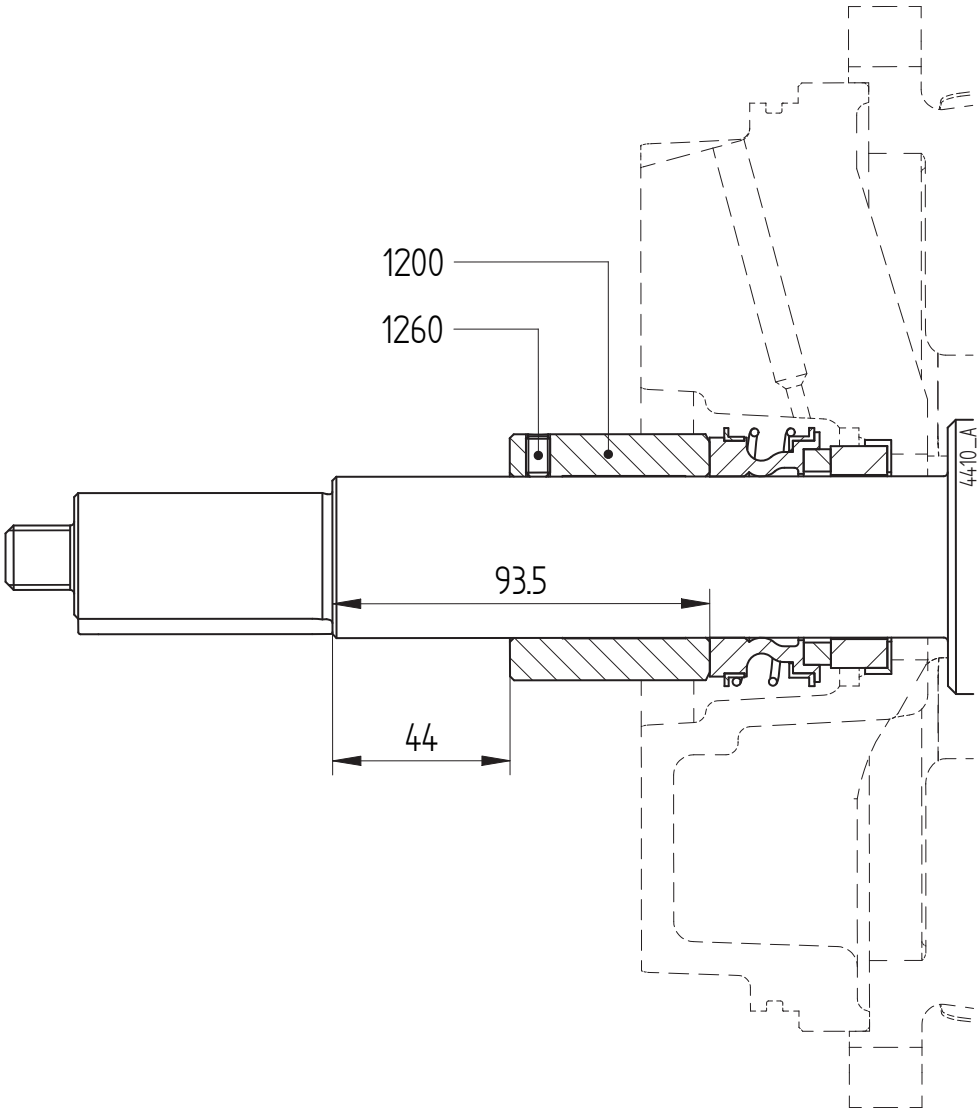


Figure 16: Shaft sleeve of 200-160.

Item	Quantity	Description	Materials		
			G1	G2	B2
1200	1	shaft sleeve	brass		
1260	3	set screw	stainless steel		

9.4 Base plate

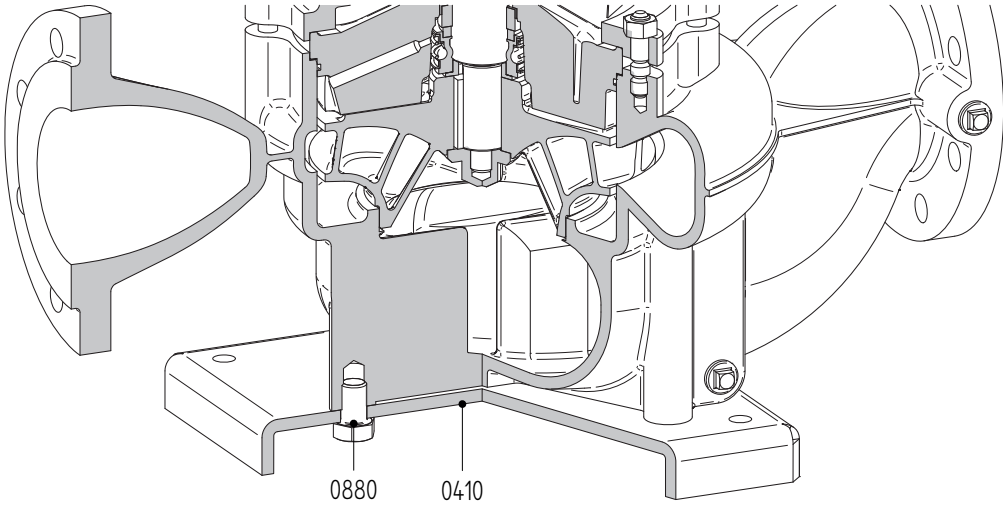


Figure 17: Base plate.

Item	Quantity	Description	Materials		
			G1	G2	B2
0410	1	base plate	steel		
0880	3	bolt	steel		

10 Technical data

10.1 Recommended locking liquids

Table 8: Recommended locking liquids.

Description	Locking liquid
cap nut (1820)	Loctite 243

10.2 Tightening moments

10.2.1 Tightening moments for bolts and nuts

Table 9: Tightening moments for bolts and nuts.

Materials	8.8	A2, A4
Thread	Tightening moment [Nm]	
M6	9	6
M8	20	14
M10	40	25
M12	69	43
M16	168	105

10.2.2 Tightening moments for cap nut

Table 10: Tightening moments for cap nut (1820).

Size	Tightening moment [Nm]
M12 (bearing bracket 1)	43
M16 (bearing bracket 2)	105
M24 (bearing bracket 3)	220

10.3 Hydraulic performance

10.3.1 Performance overview

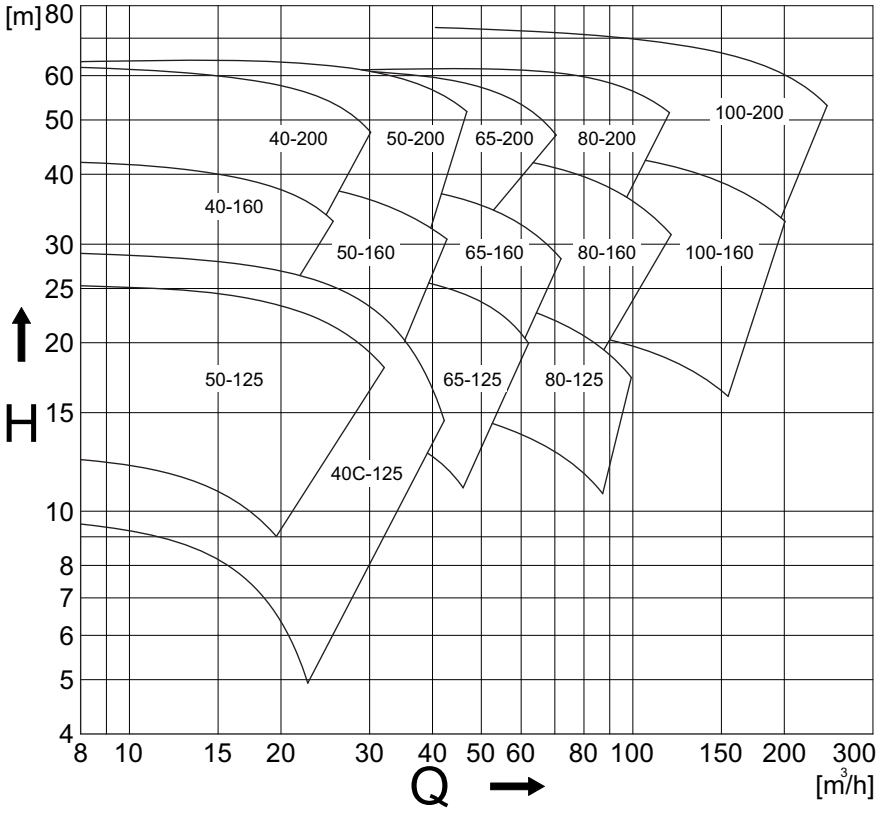


Figure 18: Performance overview 3000 min^{-1}.

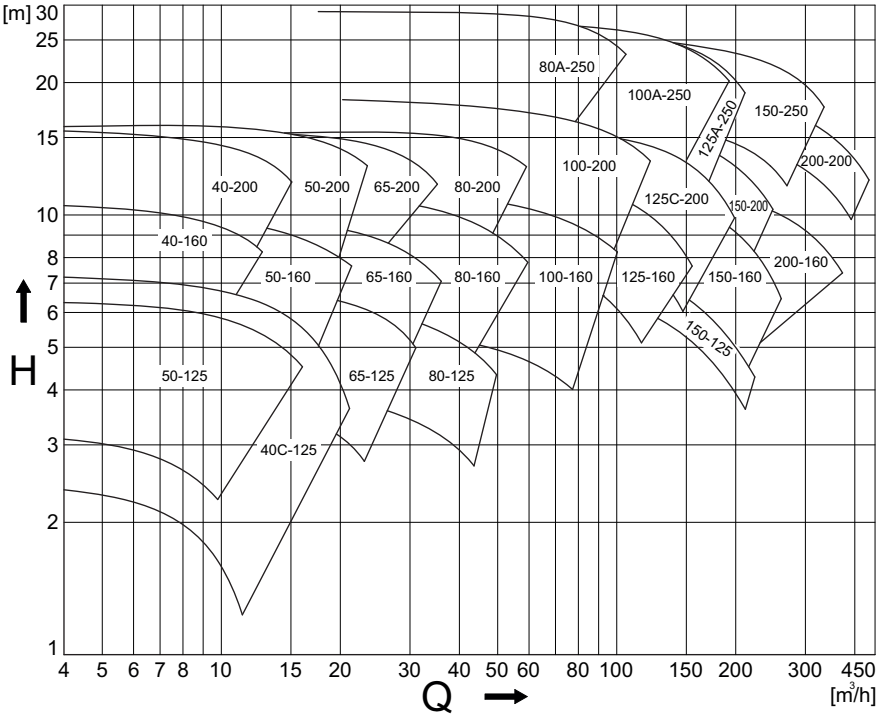


Figure 19: Performance overview 1500 min^{-1}.

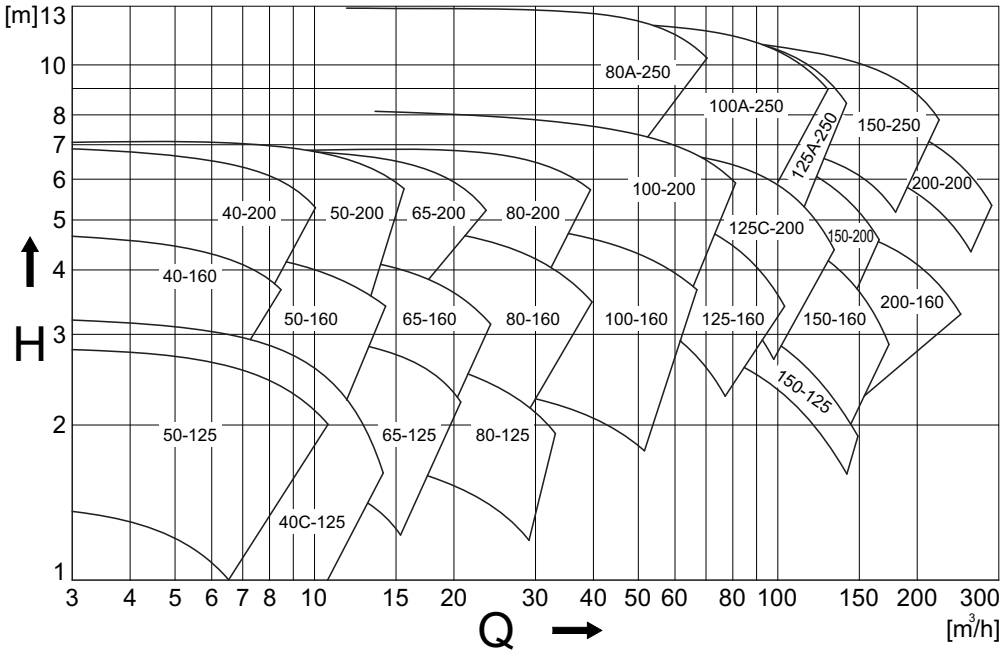


Figure 20: Performance overview 1000 min^{-1}.

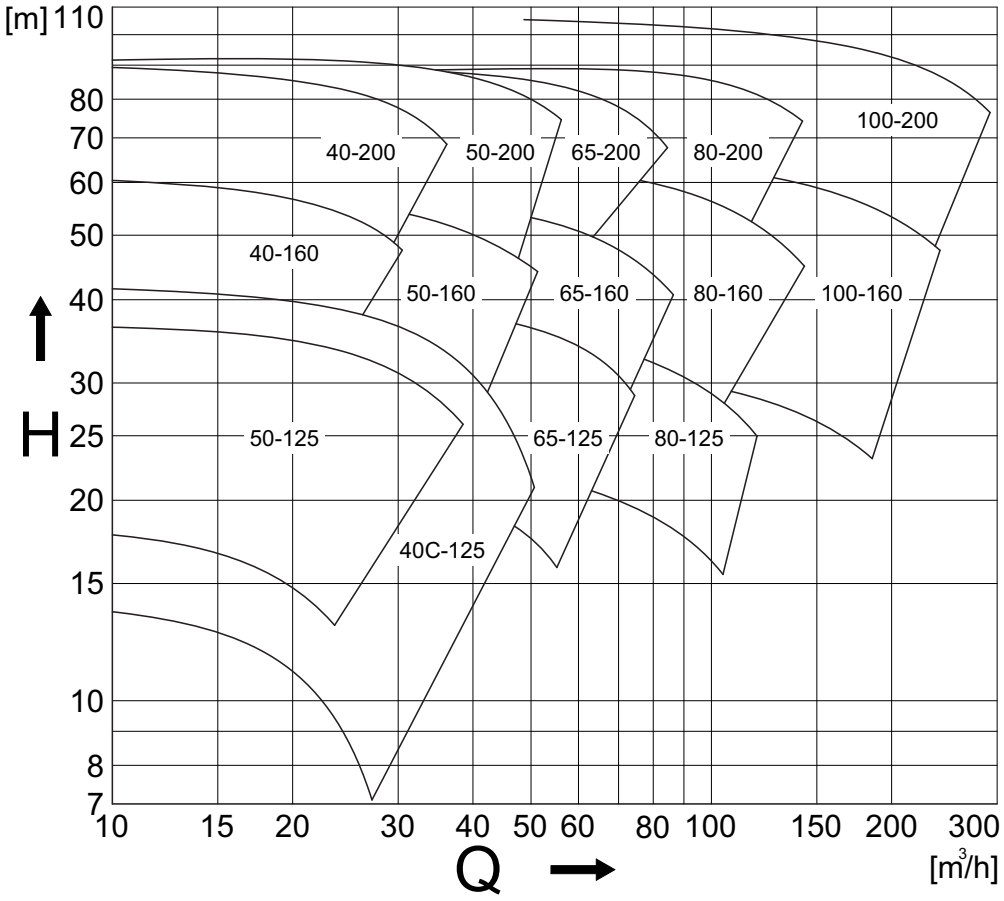


Figure 21: Performance overview 3600 min^{-1}.

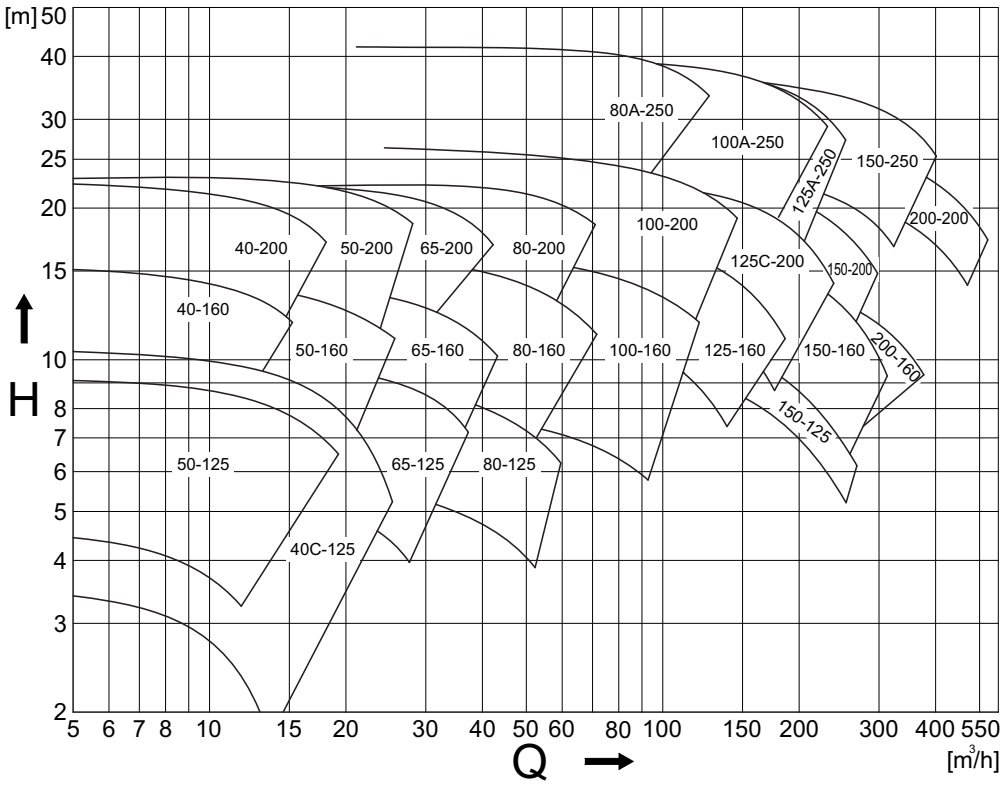


Figure 22: Performance overview 1800 min^{-1}.

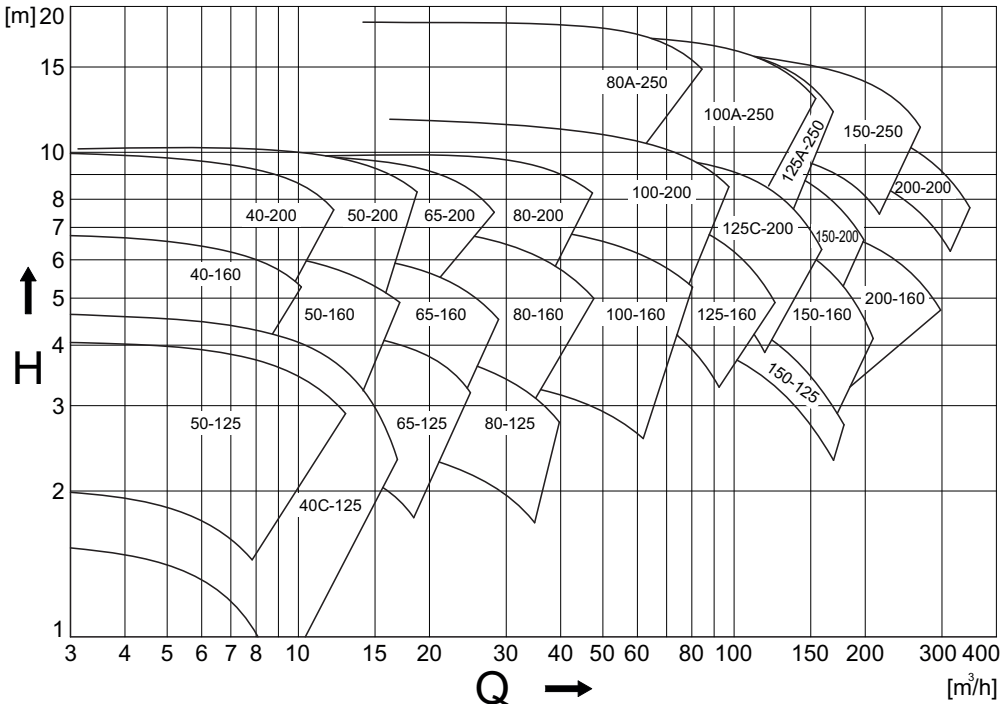


Figure 23: Performance overview 1200 min^{-1}.

10.4 Noise data

10.4.1 Pump noise as a function of pump power

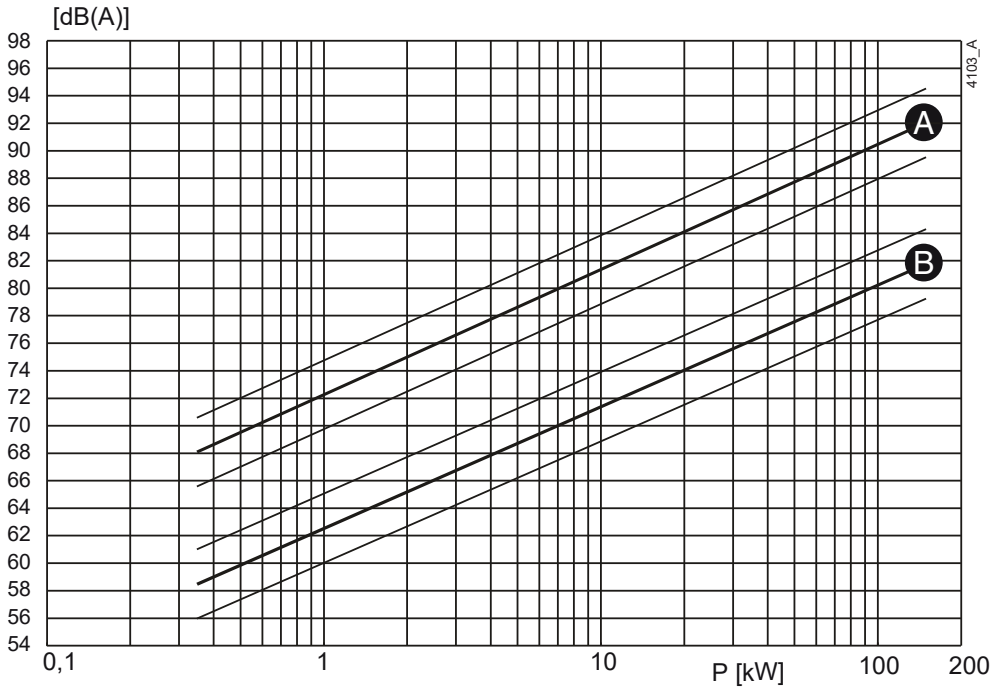


Figure 24: Noise level as function of pump power [kW] at 1450 min^{-1}
A = sound power level, B = sound pressure level.

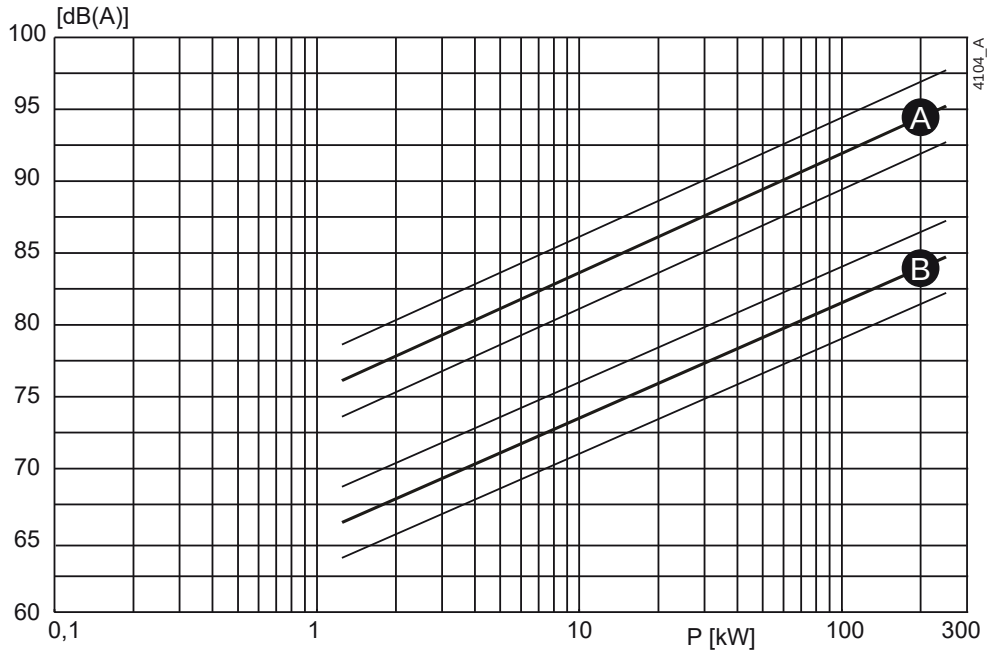


Figure 25: Noise level as function of pump power [kW] at 2900 min^{-1}
A = sound power level, B = sound pressure level.

10.4.2 Noise level of entire pump unit

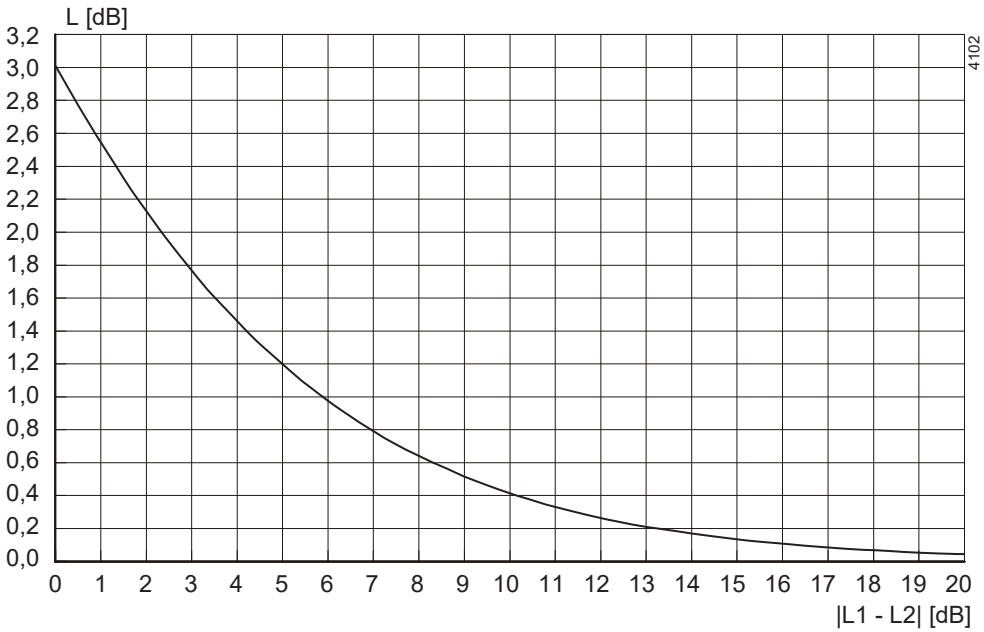


Figure 26: Noise level of entire pump unit.

In order to determine the total noise level of the entire pump unit, the noise level of the motor must be added to that of the pump. This can be easily done by using the graph above.

1 Determine the noise level (L1) of the pump, see figure 24 or figure 25.
2 Determine the noise level (L2) of the motor, see documentation of the motor.
3 Determine the difference between both levels |L1 - L2|.
4 Find the differential value on the |L1 - L2|-axis and go up to the curve.
5 From the curve go left to the L[dB] -axis and read out the value.
6 Add this value to the highest value of both noise levels (L1 or L2).

Example:

1 Pump 75 dB; motor 78 dB.
2 |75-78| = 3 dB.
3 3 dB on the X-axis = 1,75 dB on the Y-axis.
4 Highest noise level + 1,75 dB = 78 + 1,75 = 79,75 dB.

Index

Order form for spare parts

FAX Nr.	
ADDRESS	

Your order will only be dealt with if this order form has been correctly completed and signed.

Order date:	
Your order number:	
Pump type:	
Execution:	

Quantity	Item. No.	Part	Article number pump

Delivery address:	Invoicing address:

Ordered by:	Signature:	Telephone:

Johnson Pump®

CombiLineBloc

In-line circulation pump in block execution

SPXFLOW®

Dr. A. F. Philipsweg 51
9403 AD Assen
THE NETHERLANDS

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F: + 31 (0) 592 37 67 60
E: johnson-pump.nl@spxflow.com

www.spxflow.com/johnson-pump

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