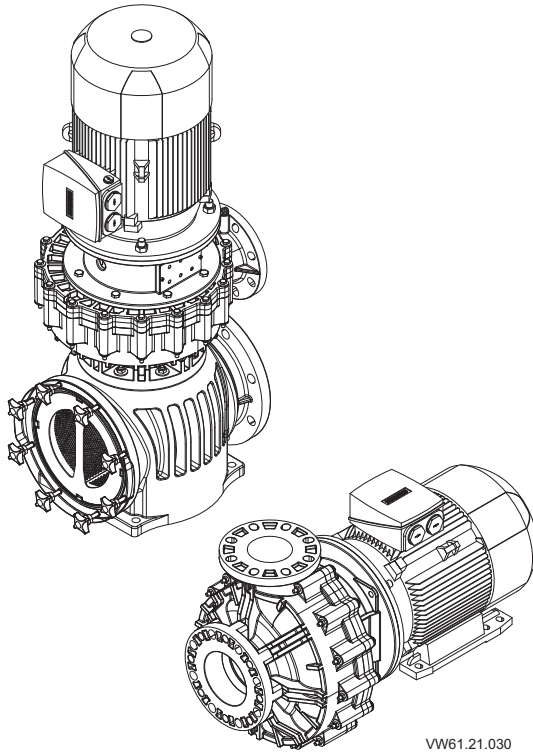


EN Translation of original operation manual

Normblock Multi
BADU[®] Block Multi



VW61.21.030



BADU® is a trademark of
SPECK Pumpen Verkaufsgesellschaft GmbH

Hauptstraße 3
91233 Neunkirchen am Sand, Germany
Phone +49 9123 949-0
Fax +49 9123 949-260
info@speck-pumps.com
www.speck-pumps.com

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Glossary

Unit

Pump built into the system.

Pressure line

Pipe connected to the pressure discharge.

Motor unit

Pump without housing.

Item number

The item numbers contained in the text e.g. (210) can be found in the exploded drawing.

Pump

Machine with motor

Suction line

Pipe connected to the suction discharge.

Declaration of clearance

A declaration of clearance is a statement from the customer confirming that the product has been drained correctly should it need to be returned to the manufacturer. This is to certify that wetted parts do not pose a danger to health or the environment.

1 About this document

1.1 Using this manual

This manual is a component of the pump/unit. The pump/unit was manufactured and tested according to the generally accepted rules of technology. However, if the pump/unit is used incorrectly, not serviced enough or tampered with, danger to life and limb or material damage could result.

- ➔ Read the manual carefully before use.
- ➔ Keep the manual during the service life of the product.
- ➔ Provide access to the manual for operating and service personnel at all times.
- ➔ Pass the manual on to any future owners or operators of the product.

1.2 Target group

This instruction manual is intended for qualified professionals. See chapter 2.2 on page 9.

1.3 Other applicable documents

- Packing list
- Supplier documentation

1.3.1 Symbols and means of representation

Warnings are used in this manual to warn you of personal injury.

- ➔ Always read and observe warnings.

DANGER

Danger for people.
Non-observance results in death or serious injury.

WARNING

Danger for people.
Non-observance can result in death or serious injury.

CAUTION

Danger for people.
Non-observance can result in light to moderate injury.

NOTICE

Notes to prevent material damage, for better understanding or to optimise the workflow.

Important information and technical notes are specially marked to explain correct operation.

Symbol	Meaning
➔	Instructions for a one-step action.
1.	Directions for a multi-step action.
2.	➔ Observe the order of the steps.

2 Safety

2.1 Intended use

The pump/unit is intended for the circulation of swimming pool water.

Observing the following information is vital for intended use:

- This manual
- Supplier documentation

The pump may only be operated within the application limits and characteristics, as specified in this manual.

Any other use or use exceeding this is **not** an intended use and must first be authorized by the manufacturer/supplier.

2.1.1 Possible misuse

- Installing the pump/unit with stress on the pipes.
- Using the pump/unit beyond the operating limits specified in the pump data sheet, e.g. excessive system pressure or pressure surges on the unit side.
- Opening and servicing of the pump/unit by unqualified personnel
- Operating the pump/unit in a partly assembled state.
- Operating the pump/unit without pumping liquid.
- Incorrect installation of the pump/unit.

2.2 Personnel qualification

This unit can be used by persons with limited physical, sensory or mental capacity or by people with a lack of experience or knowledge, provided that they are supervised or have been instructed in the safe use of the unit and understand the resulting dangers.

- ➔ Ensure that the following work is only performed by trained professionals with the following qualifications:
 - For mechanical work, for example replacing ball bearings or mechanical seals: qualified mechanics.
 - For work on the electric system: electricians.
- ➔ Ensure that the following requirements are fulfilled:

- Personnel who do not yet have the appropriate qualifications must receive the required training before being allowed to work on the system.
- The personnels' responsibilities, for example working on the product, electric equipment or hydraulic systems, are set based on their qualifications and the job description.
- The personnel have read this manual and understand the necessary working steps.

2.3 Safety regulations

The operator of the system is responsible for the adherence to all relevant statutory regulations and guidelines.

- ➔ Observe the following regulations when using the pump/unit:
 - This manual
 - Warning and information signs on the product
 - Other applicable documents
 - The valid national regulations for accident prevention
 - The internal occupational, operational and safety regulations of the operator

2.4 Protective equipment

Reaching into moving parts, e.g. coupling and/or impeller fan, can cause serious injury.

- ➔ Never operate the pump/unit without protective covers.

2.5 Structural modifications and spare parts

Alterations or modifications can affect operational safety.

- ➔ Never modify or alter the pump/unit without the manufacturer's permission.
- ➔ Only use original spare parts and accessories authorised by the manufacturer.

2.6 Signs

- ➔ Ensure that all the signs on the complete pump/unit remain legible.

2.7 Residual risk

2.7.1 Falling parts

The lifting hooks on the motor are designed for the weight of the motor. The lifting hooks can break if the complete pump unit is attached.

- ➔ Attach the pump unit consisting of motor, pump and filter housing (where necessary) on both the motor and the pump sides. See chapter 4.2 on page 20.
- ➔ Only use hoisting and load-bearing equipment which is suitable and technically sound.
- ➔ Do not stand under suspended loads.

2.7.2 Rotating parts

There is a risk of shearing and crushing due to exposed rotating parts.

- ➔ Only perform servicing when the pump/unit is not in operation.
- ➔ Prior to servicing, ensure the pump/unit cannot be switched back on.
- ➔ Immediately after finishing servicing, reattach or reactivate all protective equipment.

2.7.3 Stability

- ➔ Ensure sufficient stability of the pump/unit. There is a danger of crushing due to tilting or falling over.

2.7.4 Electrical energy

There is an increased risk of electric shock when working on the electrical system due to the humid environment.

Electrical protective earth conductors which were not installed correctly can also result in electric shocks, for example oxidation or cable breakage.

- ➔ Observe VDE and utility company regulations.
- ➔ Build swimming pools and their protection according to DIN VDE 0100-702.
- ➔ Before working on the electrical system, take the following measures:
 - Disconnect system from the power supply.

- Attach a warning sign: “Do not switch on! The system is being worked on.”
- Ensure that the system is free of voltage.
- ➔ Check the electrical system regularly to ensure it is in proper working condition.

2.7.5 Hot surfaces

The electric motor can reach temperatures of up to 70 °C. There is a risk of being burned.

- ➔ Do not touch the motor during operation.
- ➔ Allow the pump/unit to cool down before servicing it.

2.7.6 Hazardous materials

- ➔ Ensure that leaks of dangerous pumped fluids/gases are led away without endangering people or the environment.
- ➔ Decontaminate the pump completely during disassembly.

2.7.7 Suction danger

Ensure that the suction openings conform to current guidelines, standards and instructions.

2.8 Defects

- ➔ In case of a defect, immediately switch the pump off and remove it from operation.
- ➔ Have all defects repaired immediately.

Seized pump

If a pump seizes, and is switched on several times repeatedly, the motor can be damaged. Observe the following points:

- ➔ Do not switch the pump/unit on repeatedly.
- ➔ Turn motor shaft. See chapter 6.1.3 on page 30.
- ➔ Clean pump.

2.9 Preventing material damage

2.9.1 Leakage and pipe breakage

Vibrations and thermal expansion can cause pipes to break.

- ➔ Install the pump/unit in a manner which reduces structure-borne and airborne noise transmission. When doing so, observe relevant regulations.

If the pipe forces are exceeded, leaks can occur at the screwed connection or the pump itself.

- ➔ Do not use the pump as a fixed point for the pipe line.
- ➔ Connect pipes free of load and mount them elastically. Install compensators.
- ➔ If the pump leaks, the unit may not be operated and must be disconnected from the mains power supply.

2.9.2 Dry running

If run dry, mechanical seals and synthetic parts can be destroyed within only a few seconds.

- ➔ Do not allow the pump to run dry. This also applies to checking the rotation direction.
- ➔ Purge air from pump and suction line prior to start-up.

2.9.3 Cavitation

Pipes which are too long increase resistance. This results in risk of cavitation.

- ➔ Ensure that the suction line does not leak.
- ➔ Observe the maximum pipe length.
- ➔ Only switch the pump on when the valve on the delivery side is opened halfway.
- ➔ Open the valve on the suction side completely.

2.9.4 Overheating

The following factors can result in the pump overheating:

- Excessive pressure on the delivery side.
- Motor overload switch set incorrectly.
- Ambient temperature which is too high.
- ➔ Do not operate the pump with the valves closed, minimum flow rate 10 % of Q_{max} .

- For pumps with a three-phase motor and no motor protection, install an overload switch and set it correctly.
- Do not exceed the permitted ambient temperature of 40 °C.

2.9.5 Pressure surges

The pressure in the filter housing or pump housing (BADU Block) must not exceed 2.5 bar or 3.0 bar for the Normblock. Otherwise damage may occur to the acrylic glass lid or other pump parts.

- Install a non-return valve.
- The use of a frequency converter or a smooth start is recommended in order to rule out pressure surges on the unit side.

2.9.6 Blockages in the pump

Pieces of dirt in the suction line can clog and block the pump.

- Do not operate the pump without a strainer basket.
- Check how easily the pump rotates before starting it up and after longer idle or storage periods.
- Remove any impurities from the suction line.

2.9.7 Drainage

An insufficient drain gap can damage the motor.

- Do not block or seal the drain gap between the pump housing and the motor.
- Never assemble the unit with the motor positioned underneath.

2.9.8 Risk of frost

- Drain the pump/unit and pipes at risk of freezing in plenty of time.
- During the frosty period, the pump should be disassembled and stored in a dry room.

2.9.9 Water temperature

The water temperature must not exceed 40 °C.

2.9.10 Deformation of the pump

Deformation of the pump must be avoided.

- ➔ Adhere to the assembly torques stipulated for the screws.
- ➔ The pump must be set up completely on the foundation.

2.9.11 Safe use of the product

Safe use of the product is no longer guaranteed in the following instances:

- ➔ If the pipework is not in proper condition.
- ➔ If the pump seizes.
- ➔ If protective devices are damaged or missing, e.g. protection against accidental contact.
- ➔ If there is stress on the pump/unit or pipes during installation.
- ➔ If the pump/unit is not installed correctly.
- ➔ If there is a technical fault.

3 Description

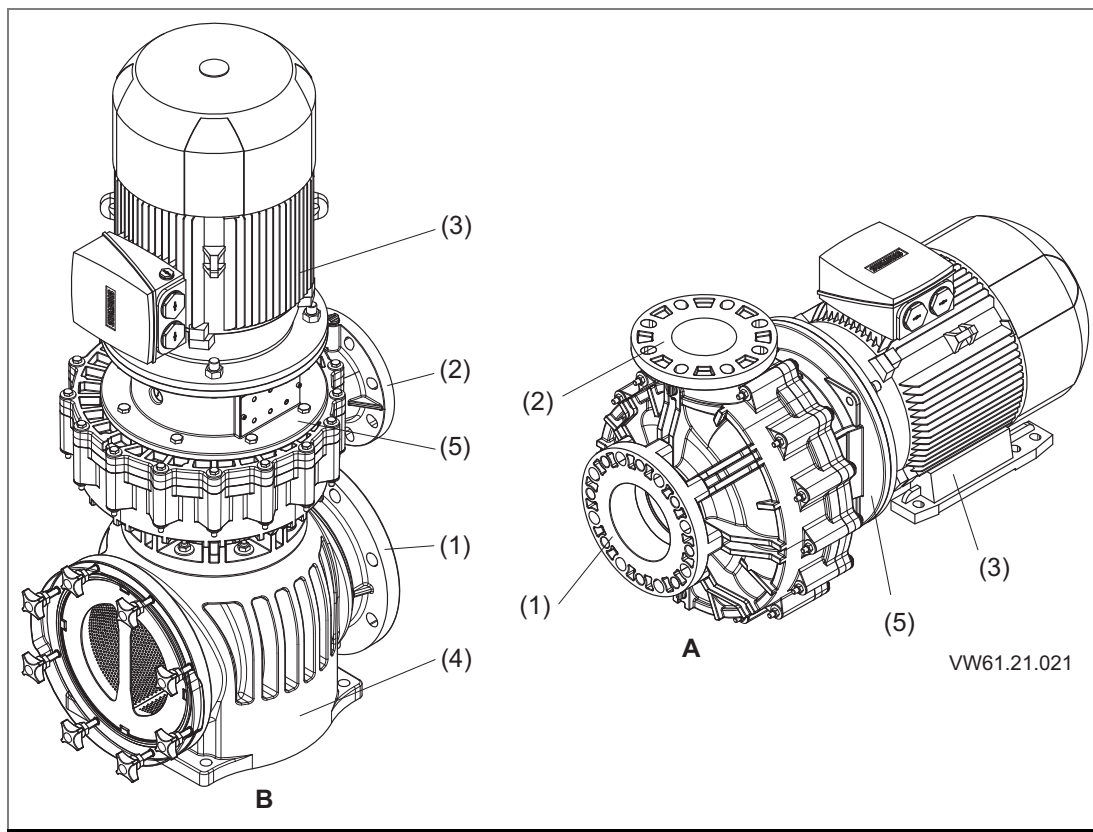


Fig. 1

A	Normblock Multi	B	BADU Block Multi
(1)	Suction discharge	(2)	Pressure discharge
(3)	Motor	(4)	Filter housing with strainer basket
(5)	Motor lantern		

3.1 Function

The pump draws the swimming pool water in via a shut-off valve in the suction line and suction discharge (1). A strainer basket is integrated in the filter housing (4) of the BADU Block Multi which filters out rough impurities. The water is pumped to the filter unit via the discharge outlet (2) and a shut-off valve in the pressure side. The drive shaft in the motor (3) is connected to the pump shaft. The motor (3) is connected to the pump with the drive lantern (5).

3.2 Designation

Example: Normblock Multi 100/250

Code	Description
Normblock Multi	Series
100	Nominal discharge nozzle diameter [mm]
250	Nominal impeller diameter [mm]

Example: BADU Block Multi 100/250

Code	Description
BADU Block Multi	Series
100	Nominal discharge nozzle diameter [mm]
250	Nominal impeller diameter [mm]

3.3 Name plate

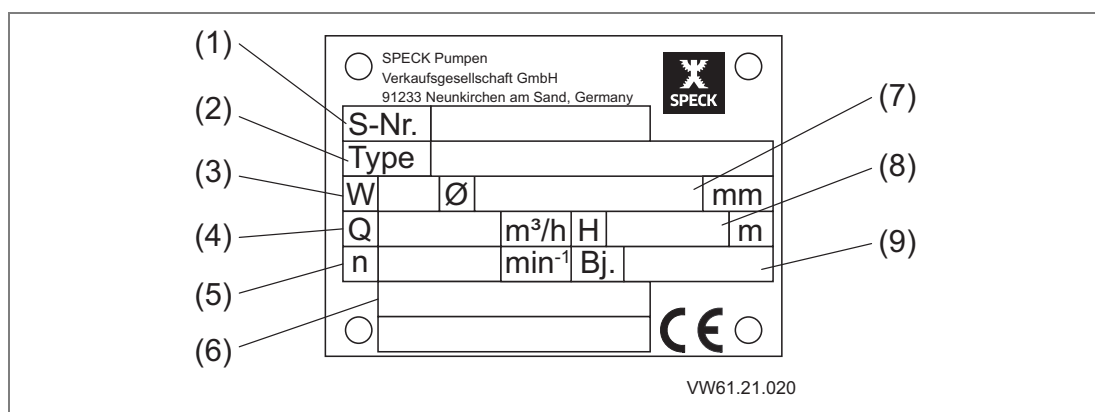


Fig. 2

(1)	Serial number	(2)	Series/construction size
(3)	Material version	(4)	Flow rate
(5)	Motor speed	(6)	Other
(7)	Impeller diameter	(8)	Dynamic head
(9)	Construction year		

3.4 Design

3.4.1 Normblock Multi

The Normblock Multi is a non-self-priming, single stage centrifugal pump, developed in a monoblock design.

A mechanical seal is used to seal the shaft.

3.4.2 BADU Block Multi

The BADU Block Multi is a non-self-priming, single stage centrifugal pump, developed in a vertical monoblock design. The pump and the pre-filter housing are joined together via the pump flange.

A mechanical seal is used to seal the shaft.

4 Transport and intermediate storage

4.1 Transport

- ➔ Check the delivery condition.
 - Check the packaging for transport damage.
 - Determine damages and contact the manufacturer and the insurance.

NOTICE

Damage to the mechanical seal due to improper transportation.

- ➔ Protect the pump shaft against displacement during transport with transport insurance.
-

4.1.1 Transporting the pump without the motor

The pump shaft (210) must be fixed.

- ➔ Disassemble the coupling protection (681) from the drive lantern.
- ➔ Loosen screws (901.3).
- ➔ Push the lock washers (931) into the shaft groove.
- ➔ Tighten screws (901.3).

4.2 Lifting the pump

⚠ DANGER

Goods being transported can fall and result in death or crushing of limbs!

The lifting hooks on the motor are designed for the weight of the motor. The lifting hooks can break if the complete pump unit is attached.

- ➔ Attach the hoisting equipment to both the motor and pump sides if hooks are provided.
- ➔ Use only hoisting and load-bearing equipment which is suitable, technically sound and can bear enough weight.
- ➔ Only transport the pump/unit in the correct position.
- ➔ Do not stand under suspended loads.
- ➔ The motor is the heaviest part of the pump.

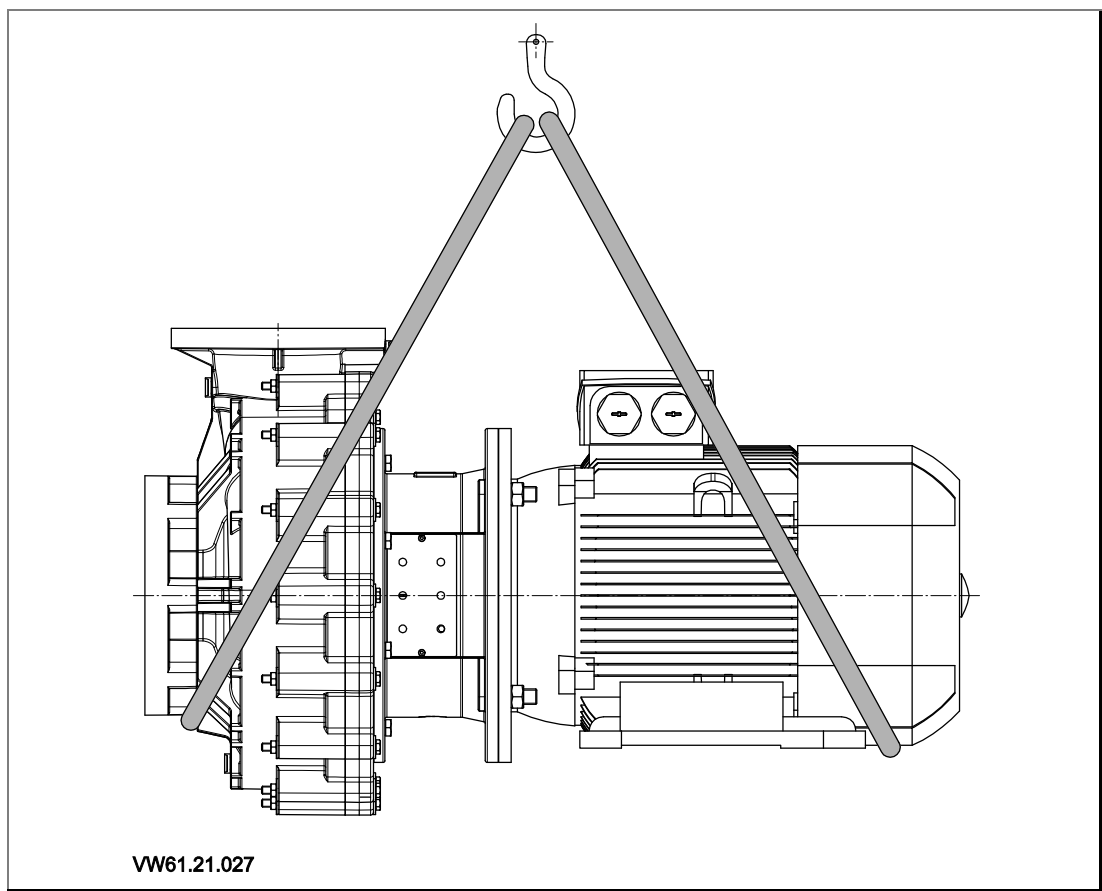


Fig. 3

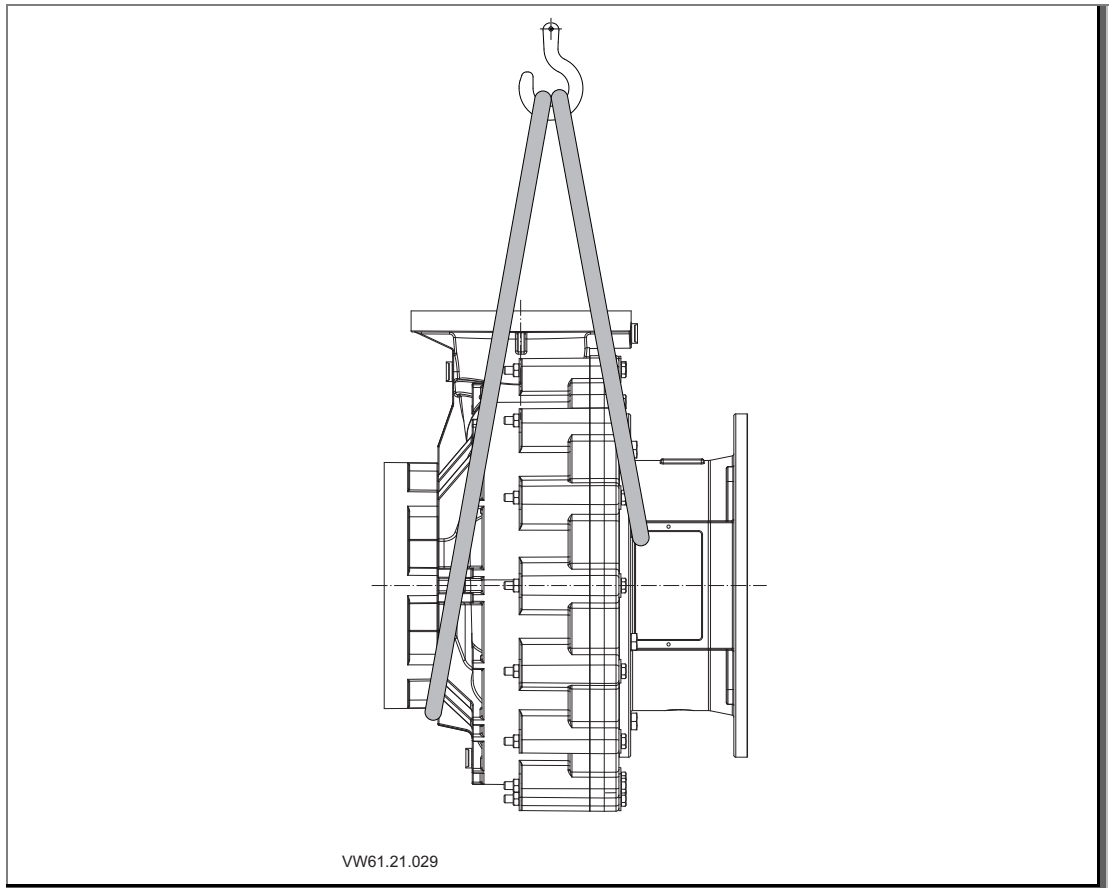


Fig. 4

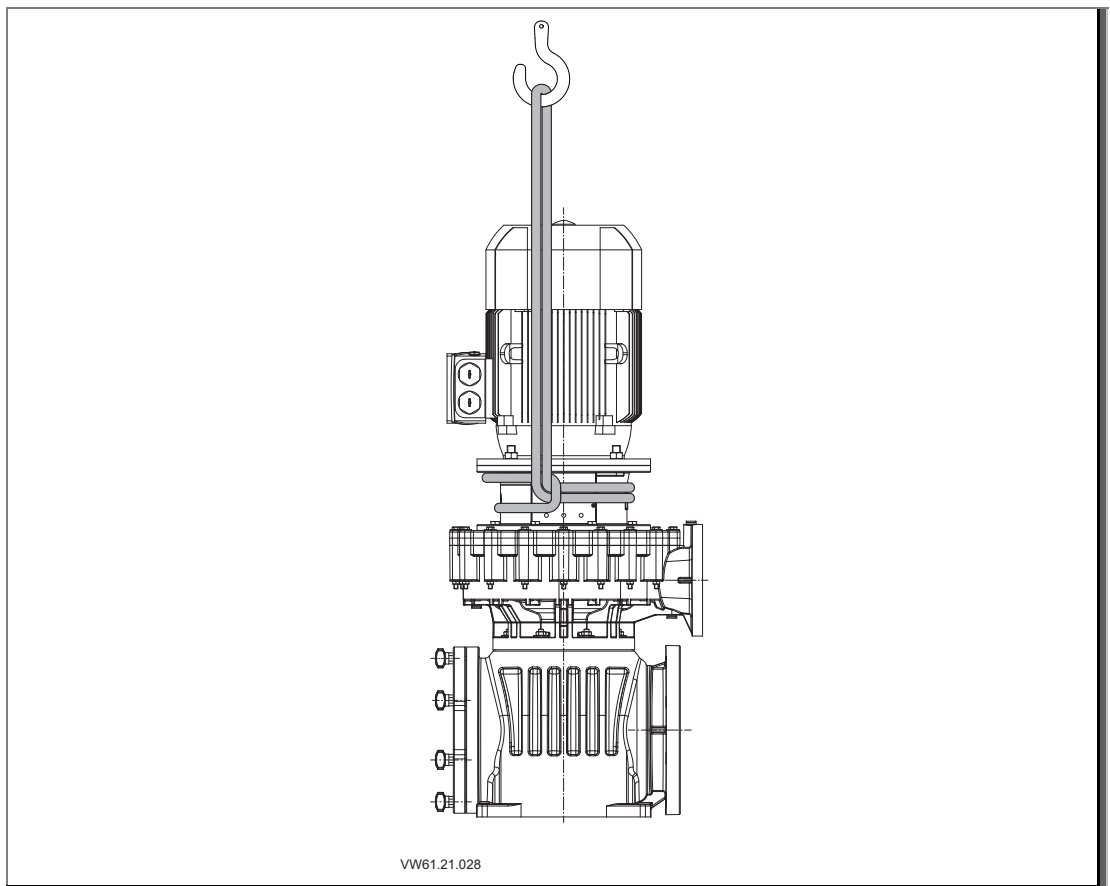


Fig. 5

4.3 Storage

NOTICE

Corrosion is possible due to storage in humid conditions with fluctuating temperatures!

Condensation can corrode windings and metal parts.

- ➔ Store the pump/unit in a dry environment at a temperature which is as constant as possible.

NOTICE

There is a risk of damage to the winding and entry of foreign matter due to open ports!

- ➔ Do not remove the port covers until the pipes are ready to be connected.

The shaft must be turned by hand once a week, for example via the motor fan or pump shaft.

New pumps/units are treated in the factory so that they are protected for 12 month when stored correctly.

For storage of units which have already been operated, See chapter 6.2.2 on page 32.

4.4 Returns

- Drain the pump completely.
- Clean the pump and rinse it with clear water, especially with hazardous or risky pumping liquids.
- Complete the declaration of clearance and return it with the pump.

5 Installation

5.1 Installation site

5.1.1 Installation surface

- ➔ The installation surface must be level and horizontal in order to avoid damage.
- ➔ Observe weight indications!

5.1.2 There must be ground drainage

- ➔ Calculate the size of the ground drain according to the following criteria:
 - Size of the swimming pool.
 - Circulation flow rate.

5.1.3 Ventilation and aeration

- ➔ Ensure sufficient ventilation and aeration. The ventilation and aeration must ensure the following conditions:
 - Prevention of condensation.
 - Cooling of the pump motor and other system components, for example switch cabinets and control units.
 - Limitation of the ambient temperature to maximum 40 °C.

5.1.4 Structure-borne and airborne noise transmission

- ➔ Observe regulations for structural noise protection, for example DIN 4109.
- ➔ Install the pump in a manner which reduces structure-borne and airborne noise transmission. Vibration-absorbing materials are suitable bases. Examples:
 - Anti-vibration buffers (Normblock Multi)
 - Cork lining
 - Sufficiently hard foam

5.1.5 Reserve space

- ➔ Calculate the reserve space to allow the motor unit to be removed in the direction of the motor fan with the help of lifting equipment and the strainer basket to be removed from the front.

5.1.6 Fasteners

- Fasten pump using screws.

5.2 Pipes

5.2.1 Pipe sizing

Suction lines which are too long have significant disadvantages:

- Higher resistance which results in reduced suction performance and a higher risk of cavitation.

A minimum length of double the inner diameter of the suction flange must be planned for the calming section in front of the suction flange.

For longer pipes, losses due to pipe friction must be taken into account.

- The nominal diameter of the pipe must be planned according to the pump connections.
- Do not exceed maximum flow speeds.
 - Suction line: 1.5 m/s
 - Pressure line: 2.5 m/s

5.2.2 Laying pipes

- Keep the suction and pressure lines as short and straight as possible.
- Avoid sudden changes to the cross-section and direction.
- Lay the suction line below the water level.
- Lay the suction line as follows to prevent air pockets from forming:
 - For intake mode: continuously falling.
 - For suction operation mode: continuously rising.
- If clogging is possible, for example with straw or grass, install a filter in the intake or the suction line.
- Depending on the type of pump and system, install a non-return valve as necessary.
- Install a shut-off valve in both the suction and pressure lines.
- Avoid valves which close suddenly. Install a shock absorber or air vessel if necessary.
- Ensure that the suction line cannot leak.

- ➔ Adapters with large nominal diameters and approx. 8° extending angles should be used in order to avoid pressure loss.
- ➔ No stress or torque from the pipe system may affect the pump.

5.3 Installation

The pump should be installed below the water level (max. 3 m) in intake mode.

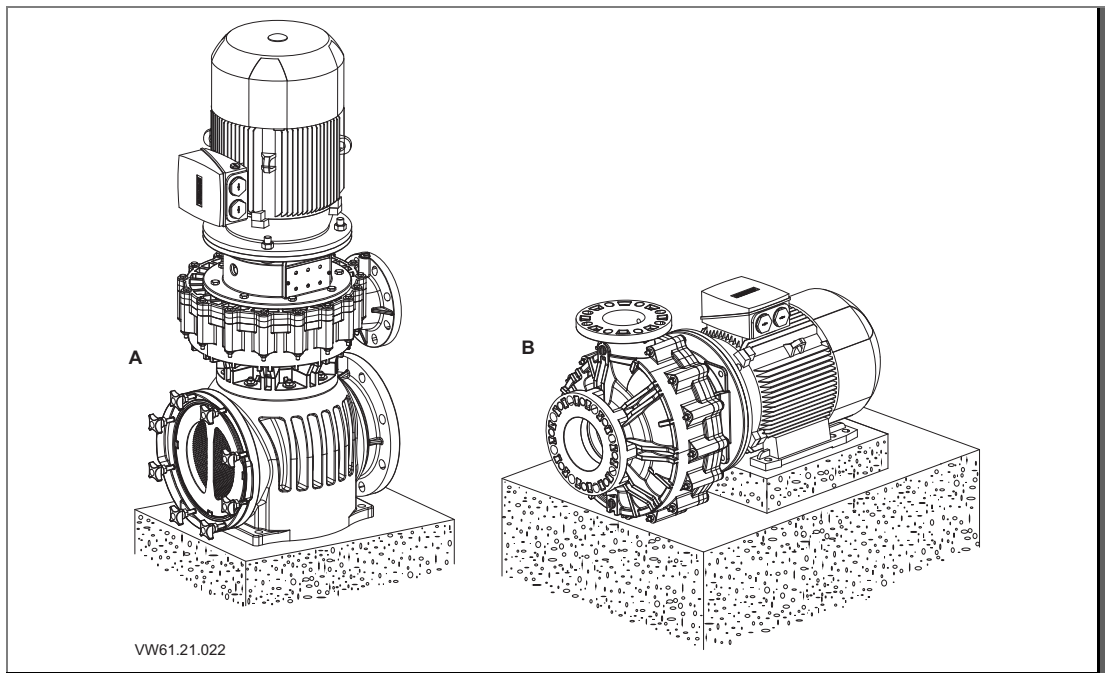


Fig. 6

A	BADU Block Multi	B	Normblock Multi
----------	------------------	----------	-----------------

The BADU Block Multi filter housing must be set up completely on the foundation.

The Normblock Multi must be set up so that the pump housing stands freely and is not supported. An elevation on the foundation must therefore be built for the assembly of the motor feet.

5.3.1 Installing the pump and connecting it to the pipe

1. When installing the pump, align the pump with the discharge outlet using a spirit level.
2. Clean and rinse the pump, pipes and connections thoroughly.

NOTICE

The motor can be damaged due to insufficient drainage!

- ➔ Do not block or seal the drain gap between the pump housing and the motor.

NOTICE

If it is sealed incorrectly, the thread can be damaged and the sealing effect can be reduced!

- ➔ Use Teflon tape for assembly.

NOTICE

The pump can be damaged by unauthorised mechanical strains being placed on the pump!

- ➔ Take the pipe up directly before the pump and connect it free of tension.

3. Connect the pipe free of tension according to the VDMA standard sheet 24277. Use compensators.
4. Ensure that any leaks cannot cause consequential damage. Install a suitable retainer if necessary.

WARNING

Pumping medium hazardous to health!

- ➔ Observe legal regulations regarding the disposal of media hazardous to health.

5.4 Electrical connection

WARNING

Risk of electric shock due to incorrect connections!

- Electrical connections must always be carried out by authorised specialists.
- Observe VDE and utility company regulations.
- Install swimming pools and their protection according to DIN VDE 0100-702.

-
- Install a disconnecting device with at least a 3 mm contact gap per pole to interrupt the power supply.

WARNUNG

Risk of electric shock due to voltage on the housing!

- An overload switch which is set correctly must be installed for pumps with three-phase motors without motor protection. In doing so, observe the values on the motor name plate.
-
- Protect power supply with a ground fault circuit interrupter, nominal residual current $I_{FN} \leq 30 \text{ mA}$ (higher current class if necessary when other devices are being run at the same time – always according to the local regulations).
 - Only use suitable pipe types according to regional regulations.
 - Adjust minimum diameter of the pipes to accommodate the motor output and pipe length.
 - If hazardous situations can occur, provide emergency off switch according to DIN EN 809. The builder/operator must make a decision according to this standard.
 - The use of a frequency converter or a smooth start is recommended in order to rule out pressure surges on the unit side.

5.5 Check the direction of rotation

NOTICE

- Ensure that the pump/unit is full of water.

NOTICE

The pump/unit is louder and pumps less when the direction of rotation is incorrect.

- Turn the motor on and immediately off again.
- Ensure that the motor turns in the direction of the arrow labeled on the fan hood. If the direction of rotation is incorrect, check the electrical connection and correct the direction of rotation.

6 Start-up/shut down

6.1 Start-up

NOTICE

The pump/unit can be damaged if it runs dry!

- ➔ Ensure that the pump/unit is always full of water. This also applies to checking the rotation direction.

6.1.1 Pre-requisites for commissioning

- Electrical connection is available.
- Pump/unit is filled with pumping liquid.
- Lockwasher has been removed from the shaft groove. The hexagon screws are tightened.
- Pump/unit is ready for operation.
- Shaft can be turned by hand.

6.1.2 Filling pump/unit with pumping liquid and ventilating

NOTICE

- ➔ Shut-off valves may not be closed during the filling procedure.

1. Ventilate the pump and suction line and fill with the pumping liquid.
 - ➔ The Normblock Multi is self-ventilating. No handles necessary.
 - ➔ BADU Block Multi: a ball valve Rp 3/8 (701) is attached in order to be able to fully ventilate the mechanical seal chamber. The mechanical seal chamber must be ventilated using the ball valve before commissioning and everytime after cleaning the strainer basket.
2. Completely open the shut-off valves in the suction line.
3. Completely open any additional connections.

NOTICE

After filling the pump, it is possible that small amounts of air may remain in the pump/unit. These will automatically be filled with the pumping liquid after the motor has been turned on.

6.1.3 Checking how easily the pump rotates

After longer idle periods, the pump must be checked for how easily it rotates while it is switched off and free of tension.

- ➔ Turn the pump shaft in the drive lantern by hand.
- or -
- ➔ Remove the fan cover and turn the fan wheel manually in the motor rotation direction.

6.1.4 Switching the pump on

Pre-requisites:

- Pump/unit is filled with pumping liquid and ventilated.
 - Pipes for filling and ventilating are closed.
 - Pipes are clean.
1. Open the valve on the intake side completely.
 2. Close or slightly open the valve on the discharge side.
 3. Switch the pump/unit on.
 4. As soon as the full speed has been reached, open the valve on the discharge side completely and set the operating point.
 5. Check the mechanical seal for leaking.

NOTICE

The pump/unit may be damaged by deviating temperatures, sounds, leakages or vibrations.

- ➔ Switch the pump/unit off and repair the cause.
-

NOTICE

Starting the unit with open pressure lines may cause the motor to overload.

- Make note of the motor's power reserve.
 - Use the soft start (operation with frequency converter).
 - Use speed regulation.
-

6.1.5 Switching the pump off

1. Close the shut-off valve in the pressure line.
2. Switch the motor off.

For longer idle periods:

1. Close the shut-off valve in the suction line.
2. Close additional connections.

Risk of frost:

1. Store the pump and pipes at risk of freezing in a dry place with no risk of frost.
2. Drain the pump and pipes.

6.2 Shutting down

- For pre-requisites for shutting down the pump see "Switching the pump off" on page 31.

NOTICE

For idle periods exceeding one year, elastomer components must be renewed.

6.2.1 Pump/unit remains assembled

- Switch the pump/unit on regularly – monthly to quarterly – during long idle periods. Switch the pump back off again after approx. 5 minutes.

This will avoid deposits forming in the pump/unit and piping system.

NOTICE

The pump/unit can be damaged if it runs dry!

- Ensure that the pump/unit is always full of water.
-

6.2.2 Pump/unit is disassembled and stored

- Drain pump/unit.
- Clean and dry pump/unit.
- Store pump/unit.

7 Faults

NOTICE

It is normal for a few drops of water to escape from the mechanical seal from time to time. This is especially true during the break-in period.

Depending on the water quality and number of operating hours, the mechanical seal can begin to leak.

→ If water pours out constantly, replace the mechanical seal.

7.1 Overview

Fault: Too low a flow rate in the pump

Possible cause	Solution
Pumping against too high a pressure.	<ul style="list-style-type: none"> ➔ Set operating point again. ➔ Check unit for impurities.
Pump and pipes not completely ventilated or filled.	<ul style="list-style-type: none"> ➔ Vent. ➔ Fill.
Intake or impeller blocked.	<ul style="list-style-type: none"> ➔ Remove impurities.
Building of air sacks in the piping.	<ul style="list-style-type: none"> ➔ Modify piping or insert a ventilation valve.
Suction height too large/Unit's NPSH (intake) too low.	<ul style="list-style-type: none"> ➔ Correct liquid levels. ➔ Install pump lower. ➔ Completely open shut-off valve in the intake. ➔ If the resistance in the intake is too large, modify the intake line. ➔ Check basket/suction opening. ➔ Observe the permitted pressure reduction speed.
Drawing in air in the mechanical seal.	<ul style="list-style-type: none"> ➔ Replace mechanical seal.
Incorrect direction of rotation.	<ul style="list-style-type: none"> ➔ Check the electrical connection to the motor and switching device.
Too low a speed.	<ul style="list-style-type: none"> ➔ Increase the voltage/frequency on the frequency converter within the permitted range.
Wear of components.	<ul style="list-style-type: none"> ➔ Replace components.
Running on two phases.	<ul style="list-style-type: none"> ➔ Renew faulty fuse. ➔ Check electrical power connections.

Fault: Motor overload

Possible cause	Solutions
Pump's back pressure is less than that indicated in the order.	<ul style="list-style-type: none"> ➔ Set operating point exactly. ➔ For constant overload turn the impeller - (further enquiry required).
Higher density of the pumping liquid than that indicated in the order.	➔ Contact manufacturer.
Too high a speed.	➔ Reduce speed - (further enquiry required).
Running on two phases.	<ul style="list-style-type: none"> ➔ Renew faulty fuse. ➔ Check electrical power connections.
Transport fuse not removed from the shaft groove.	➔ Remove the transport fuse from the shaft groove.

Fault: Too high a pump pressure

Possible cause	Solution
Too high a speed.	➔ Reduce speed - (further enquiry required).

Fault: Increased bearing temperature

Possible cause	Solution
Pump strained or vibrations in the pipes.	<ul style="list-style-type: none"> ➔ Check pipe connections and pump fasteners, if necessary reduce the pipe bracket spacing. ➔ Fasten pipes using vibration reducing materials.
Increased axial thrust – (further enquiry required).	➔ Clean relief bore in impeller.
Flow rate too low.	➔ Increase minimum flow rate.

Fault: Pump leaks

Possible cause	Solution
Screw connection or seal faulty.	<ul style="list-style-type: none">➔ Renew seal between volute casing and housing lid.➔ Tighten screw connections.

Fault: Shaft seal leaks too much

Possible cause	Solution
Mechanical seal is worn.	➔ Renew mechanical seal.
Damage during disassembly.	➔ Renew mechanical seal.
Pump is loud.	<ul style="list-style-type: none">➔ Correct suction conditions.➔ Adjust pump unit.➔ Increase the pressure on the suction discharge.
Pump strained or vibrations in the pipes.	<ul style="list-style-type: none">➔ Check pipe connections and pump fasteners, if necessary reduce the pipe bracket spacing.➔ Fasten pipes using vibration reducing materials.
Pump shaft slipped.	➔ Fix pump shaft. See chapter 8.5.5 on page 45.

Fault: Pump is loud

Possible cause	Solution
Pump and pipes not completely ventilated or filled.	<ul style="list-style-type: none"> ➔ Vent. ➔ Fill.
Suction height too large/Unit's NPSH (intake) too low.	<ul style="list-style-type: none"> ➔ Correct liquid levels. ➔ Install pump lower. ➔ Completely open shut-off valve in the intake. ➔ If the resistance in the intake is too large, modify the intake line. ➔ Check basket/suction opening. ➔ Observe the permitted pressure reduction speed.
Wear of components.	<ul style="list-style-type: none"> ➔ Replace components.
Pump's back pressure is less than that indicated in the order.	<ul style="list-style-type: none"> ➔ Set operating point exactly. ➔ For constant overload turn the impeller (further enquiry required).
Pump strained or vibrations in the pipes.	<ul style="list-style-type: none"> ➔ Check pipe connections and pump fasteners, if necessary reduce the pipe bracket spacing. ➔ Fasten pipes using vibration reducing materials.
Imbalanced rotor.	<ul style="list-style-type: none"> ➔ Clean impeller.
Damaged bearing.	<ul style="list-style-type: none"> ➔ Replace bearing.
Flow rate too low.	<ul style="list-style-type: none"> ➔ Increase minimum flow rate.

Fault: Unauthorised increase in pump temperature

Possible cause	Solution
Pump and pipes not completely ventilated or filled.	<ul style="list-style-type: none">➔ Vent.➔ Fill.
Suction height too large/Unit's NPSH (intake) too low.	<ul style="list-style-type: none">➔ Correct liquid levels.➔ Install pump lower.➔ Completely open shut-off valve in the intake.➔ If the resistance in the intake is too large, modify the intake line.➔ Check basket/suction opening.➔ Observe the permitted pressure reduction speed.
Flow rate too low.	<ul style="list-style-type: none">➔ Increase minimum flow rate.

8 Maintenance

8.1 Maintenance during operation

- Pay attention to calm and vibration-free operation.
- Check the mechanical seal for possible leaks.
- Check the static seals for possible leaks.
- Check running noises in the bearing. Risk of wear.
- Check the function of additional connections.
- Guarantee operational readiness of reserve pumps. Operate them once a week.

8.2 Maintenance work

NOTICE

- Before maintenance work, close all shut-off valves and drain all pipes.

When?	What?
Regularly	<ul style="list-style-type: none"> → Clean strainer basket. → Check screw connections. → Check components for deformations.
If there is a chance of frost	<ul style="list-style-type: none"> → Drain pump and pipes sensitive to frost in good time.

- After completing all maintenance work, perform all necessary measures for start-up. See chapter 6.1 on page 29.

8.2.1 Cleaning the BADU Block Multi strainer basket

1. Switch pump off.
2. Close shut-off valves.
3. Drain the pre-filter housing (124) using the drain screw (903.3).
4. Unscrew star handle (925).
5. Remove lid (160).
6. Remove strainer basket (143).
7. Hose strainer basket (143) down with water.
8. Return strainer basket (143).

NOTICE

High concentration water treatment products can damage the pump!

- ➔ Do not place water treatment products, particularly in tablet form, into the strainer basket.

NOTICE

Tightening the lid too tight will make it difficult to re-open the lid.

- ➔ Only apply normal manual force.

9. Replace and tighten the lid (160).
10. Open the shut-off valves.
11. Fill and ventilate the pump/unit. See chapter 6.1.2 on page 29.

8.2.2 Cleaning the BADU Block Multi acrylic lid

NOTICE

Damage to the acrylic glass surface may cause stress cracks in the lid.

- ➔ Do not use aggressive or corrosive cleaning agents or solvents.
- ➔ Do not use sharp tools e.g. knives scrapers, steel wool or sponges with a rough side.
- ➔ Clean the acrylic glass lid with lukewarm water, household washing up liquid and a soft cloth.

8.3 Draining/Cleaning

- **Normblock Multi:** Loosen the drain plug (903) on the pump housing and drain and dispose of the pumped liquid properly.
- **BADU Block Multi:** Loosen the drain plug (903.3) on the pre-filter housing and drain and dispose of the pumped liquid properly.
Clean or rinse the pump/unit with clear water.

8.4 Disassembling of the pump/unit

DANGER

Danger of injury due to insufficient safeguarding.

- ➔ Turn the pump/unit off correctly.
- ➔ Close shut-off valves and additional connections.
- ➔ Drain the pump.

NOTICE

Disassembling various components from the shaft can be difficult following longer operation times.

- ➔ Either use suitable extractor devices or commercial rust solvers.

8.4.1 Preparation

1. Switch the pump off and secure it from being switched on again.
2. Reduce the pressure in the pipe system by opening a consumer.
3. Dismantle additional connections.

8.4.2 Dismantling pump/unit

NOTICE

Depending on the installation conditions, the pump and motor size are the deciding factors as to whether the pump unit should be completely dismantled or just the motor unit.

1. Loosen the piping from the suction and pressure lines.
2. Loosen the motor feet (Normblock Multi) or pre-filter housing (BADU Block Multi) screws from the foundation.
3. Remove the complete pump/unit from the piping.

8.4.3 Dismantling the motor

WARNING

Risk of crushing due to the motor tilting.

➔ Hang the motor on the lifting hooks or secure it from lifting.

1. Loosen the fastening from the motor feet to the foundation if necessary.
2. Loosen the screws (914) on the coupling protection (681).
3. Remove the coupling protection (681) from the drive lantern (341).
4. Loosen the hexagon screws (901.3).
5. Push the lock washer (931) into the grooves on the motor shaft.
6. Tighten the hexagon screws (901.3).
7. Loosen the hexagon socket screws (914.1).
8. Loosen the nuts (920.5) on the motor flange.
9. Lift off the motor (800).

8.4.4 Dismantling motor unit

1. Hang or support the motor unit to protect it from tipping over.
2. Loosen the hexagon screws (901) and nuts (920) between the pump housing (101) and gland housing (106).
3. Disconnect the hose from the vent line (701) (BADU Block Multi).
4. Remove the complete motor unit from the pump housing (101).
5. Place the motor unit on a clean and level surface.

8.4.5 Dismantling pump housing

1. Loosen the hexagon screws (901) and nuts (920) between the pump housing (101) and gland housing (161).
2. Lift off the pump housing (101).

8.4.6 Dismantling the impeller and mechanical seal

NOTICE

Normblock Multi: When dismantling the impeller and the mechanical seal we recommend taking the whole pump out of the piping system and dismantling the pump housing.

BADU Block Multi: When dismantling the impeller and the mechanical seal we recommend taking the whole pump out of the pre-filter housing or taking the whole motor unit out of the pump housing.

1. Loosen the coupling protection (681) from the drive lantern (341).
2. Hold the pump shaft (210) at the opening. See "Fig. 8" on page 46.
3. Loosen the impeller nut (922) with the inserted o-ring (412.4).
4. Remove the impeller (230). Place the impeller on a clean and level surface.
5. Remove the shaft key (940) from the shaft key nut.
6. Remove the rotating insert in the mechanical seal (433) from the impeller hub.
7. Loosen hexagon screws (901).
8. Loosen the gland housing (161) from the lantern (341).

9. Remove the counter ring in the mechanical seal (433) from the gland housing (161).

8.5 Assembling pump/unit

8.5.1 Pre-requisites

- Assemble using the exploded drawing attached.
- Check O-rings, renew if necessary.
- Assembly without aid, where possible.
- Tighten screws according to the torque indicated.
- Clean dismantled components and check them for wear. Replace with original spare parts if necessary.
- Sealing surfaces are clean and free of grease.

8.5.2 Assembling mechanical seal

NOTICE

Observe the following points:

- Clean and careful working methods.
- Only remove protection against contact on sliding surfaces directly before assembly.
- Use water as an assembly agent.
- Never use oil or grease as an assembly agent.

1. Clean the counter ring in the gland housing (161).
2. Insert the counter ring carefully. Beware of applying pressure evenly.
3. Assemble the gland housing (161) on the drive lantern (341).
4. Assemble the rotating insert in the mechanical seal (433) on the impeller hub.

8.5.3 Assembling impeller

1. Insert shaft key (940) into shaft key nut.
2. Push the impeller (230) onto the shaft (210).
3. Hold the pump shaft at the opening. See "Fig. 8" on page 46.
4. Fasten the impeller nut (922), with the inserted O-ring (412.4). Observe the torque! See chapter 8.6 on page 47.

8.5.4 Assembling motor unit

1. If necessary hang or support the motor unit to protect it from tipping over.
2. Attach a new O-ring (412) to the gland housing (161) if necessary.
3. Push the motor unit into the volute casing (101).
4. Tighten the hexagon nut (920) on the volute casing.
5. Connect the hose to the vent line (701) (BADU Block Multi).

8.5.5 Assembling motor

1. Plug the motor shaft end into the shaft (210). The motor shaft key nut and the slit in the shaft (210) have to be congruent and lay opposite the slit in the supporter ring (515). See "Fig. 7" on page 46.
2. Tighten the hexagon socket screw (914.1).
3. Loosen the hexagon screw (901.3).
4. Pull both lockwashers (931) completely out of the shaft nut. See "Fig. 8" on page 46.
5. Tighten the hexagon screw (901.3).
6. Attach and tighten the nuts (920.5).

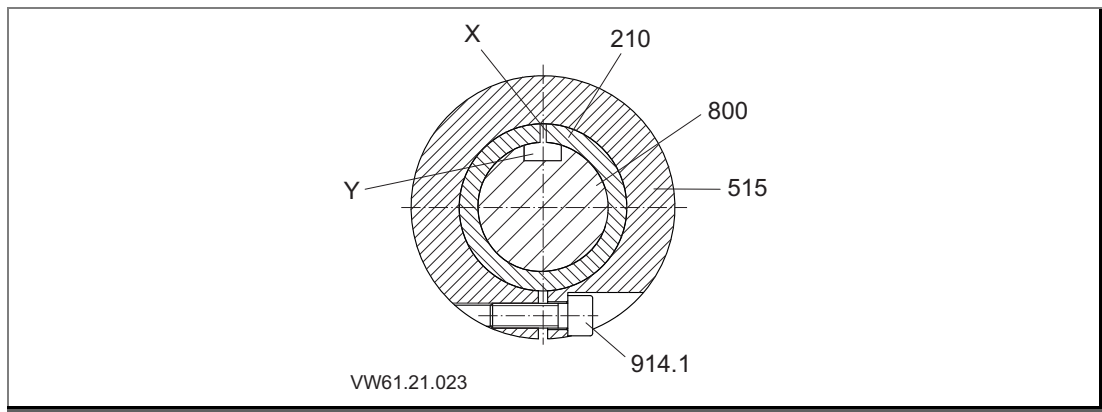


Fig. 7

X	Slit in the shaft	515	Support ring
Y	Motor shaft key nut	800	Motor
210	Pump shaft	914.1	Hexagon screw

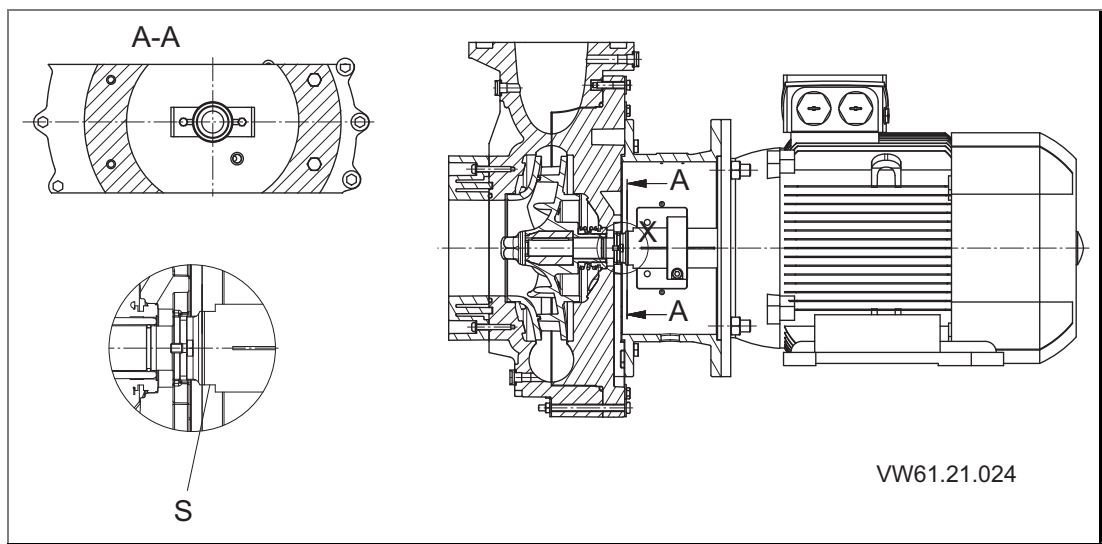


Fig. 8

S	Opening SW 34 (BG 112), SW 46 (BG 132, BG 160)
---	--

8.6 Screw torque

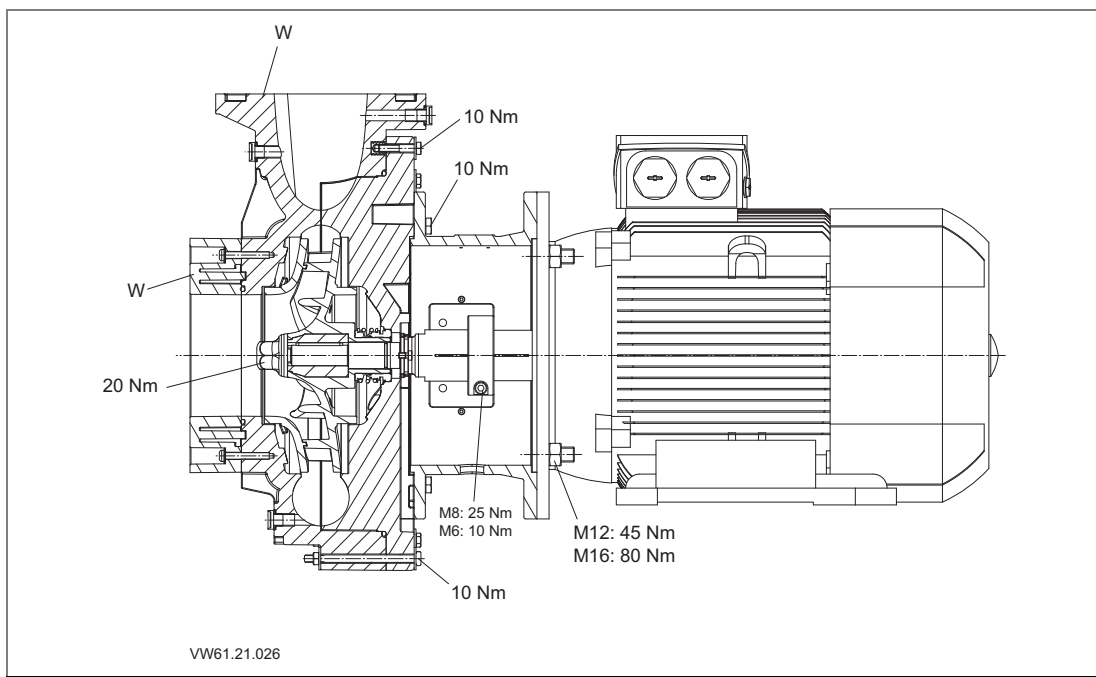


Fig. 9

W	Torque at the flange connection: 15 Nm
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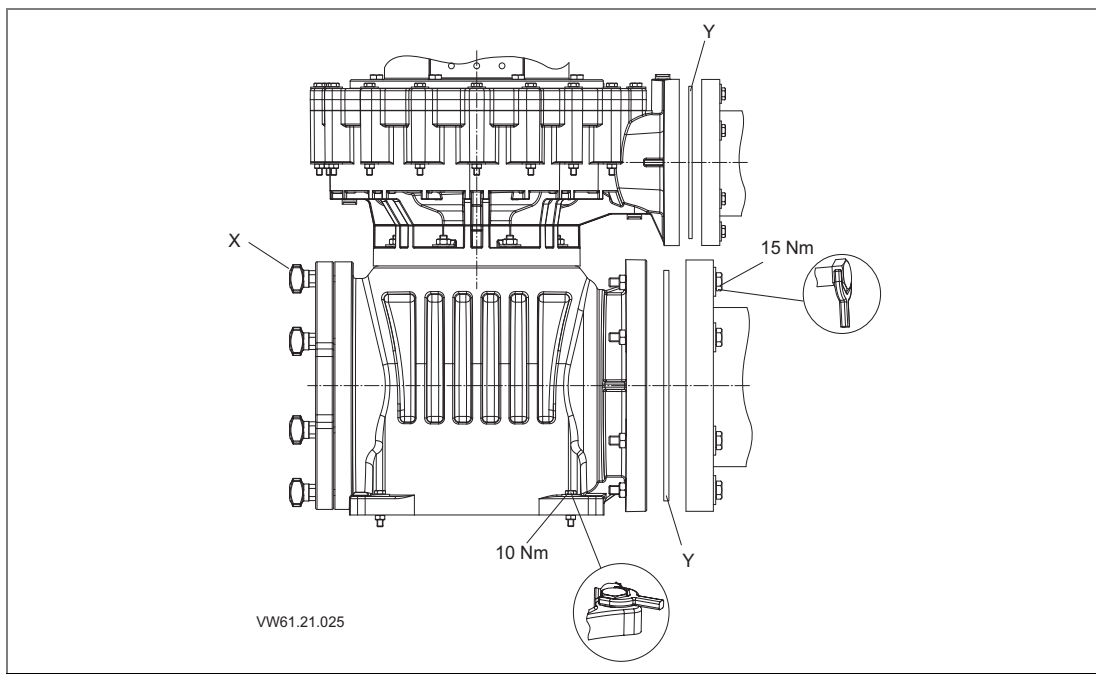


Fig. 10

X	Only fasten handtight
Y	Rubber seal 60° Shore A

8.7 Spare parts

The following specifications are required for spare part orders:

- Serial number
- Range
- Construction size
- Construction year

The specifications can be found on the pump name plate.

Further data

- Parts-description
- Position number
- Units
- Delivery address
- Shipping method

The description and position number can be found on the exploded drawing or spare parts list. See chapter 10.3 on page 57.

8.8 Warranty

The warranty includes the devices delivered and all components. However natural wear and tear (DIN 3151/DIN-EN 13306) on all turning and dynamically loaded components, including electronic components under tension, is not covered under the warranty.

Failure to comply with the safety instructions may void the warranty.

9 Disposal

- ➔ Collect harmful media and dispose of it according to the regulations.
- ➔ At the end of its service life, the pump/unit or individual components must be disposed of correctly. Disposal in the household waste is not permitted!
- ➔ Dispose of the packaging materials in the household waste in accordance with the local regulations.

10 Technical data

10.1 Dimensional drawing

Normblock Multi

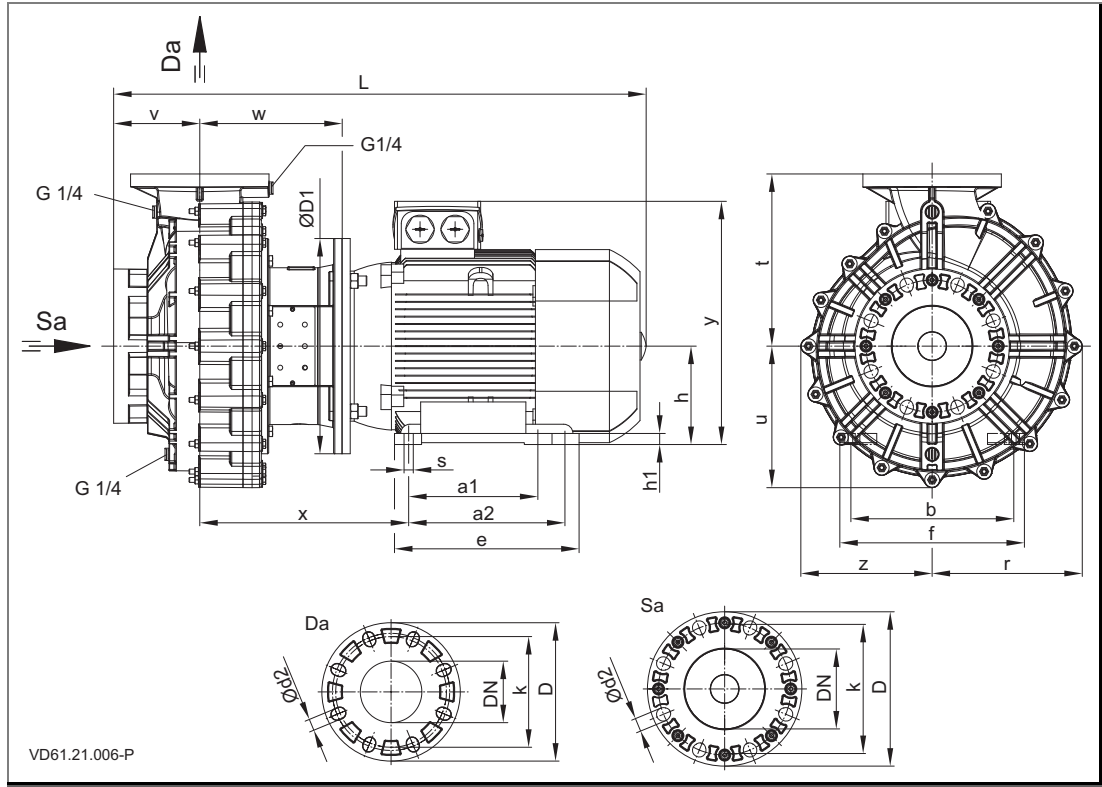


Fig. 11

Normblock 65/250

	BG 112	BG 132
a1	140	140
a2	-	178
b	19	216
e	176	218
f	226	256
h	112	132
h1	12	15
r	198	198
s	12	12
t	250	250
u	201,7	201,7
v	100	100
w	183	203,5
x	253	292,5
y	288	334
z	198	198
D1	250	300
L	630	693
Weight [kg]	55	72

Flanges compatible with

Sa	EN 1092-2 (PN16)		ASME
	DN	Ø80	Ø80
	D	Ø200	Ø200
	k	Ø160	Ø152.4
	d2	Ø19	19

Da	EN 1092-2 (PN16)		ASME
	DN	Ø65	Ø65
	D	Ø185	Ø185
	k	Ø145	Ø139.7
	d2	Ø19	Ø19

Normblock 100/250

	BG 132	BG 160
a1	140	210
a2	178	254
b	216	254
e	218	300
f	256	300
h	132	160
h1	15	18
r	244	244
s	12	15
t	280	280
u	230	230
v	140	140
w	334	396
x	202	232
y	291	340
z	214	214
D1	Ø300	Ø350
L	777	866
Weight [kg]	102	129

Flanges compatible with

Sa	EN 1092-2 (PN16)		ASME
	DN	Ø125	Ø125
	D	Ø250	Ø250
	k	Ø210	Ø215.9
	d2	Ø19	Ø22

Da	EN 1092-2 (PN16)		ASME
	DN	Ø100	Ø100
	D	Ø225	Ø225
	k	Ø180	Ø190.5
	d2	Ø19	Ø19

BADU Block Multi

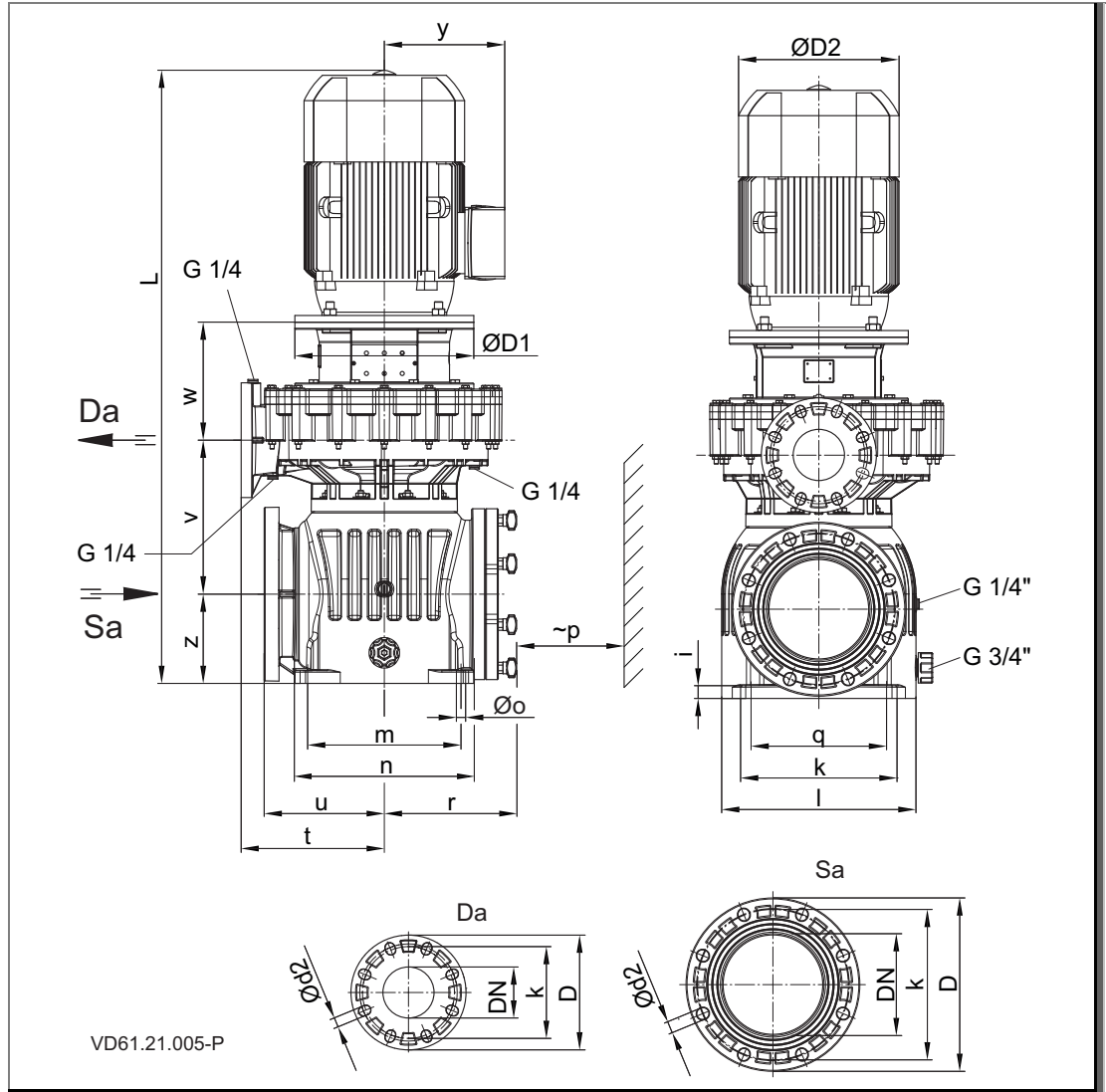


Fig. 12

BADU Block 65/250

	BG 112	BG 132
i	18	18
k	240	240
l	304	304
m	240	240
n	278	27
o	Ø14	Ø14
p	400	400
q	214	214
r	221	221
t	250	250
u	203	203
v	213	213
w	183,5	203,5
y	176	202
z	128	128
L	885,5	947
D1	250	300
D2	222	262
Weight [kg]	69	87

Flanges compatible with

Sa	EN 1092-2 (PN16)		ASME
	DN	Ø125	Ø125
	D	Ø250	Ø250
	k	Ø210	Ø215.9
	d2	Ø19	19

Da	EN 1092-2 (PN16)		ASME
	DN	Ø65	Ø65
	D	Ø185	Ø185
	k	Ø145	Ø139.7
	d2	Ø19	Ø19

BADU Block 100/250

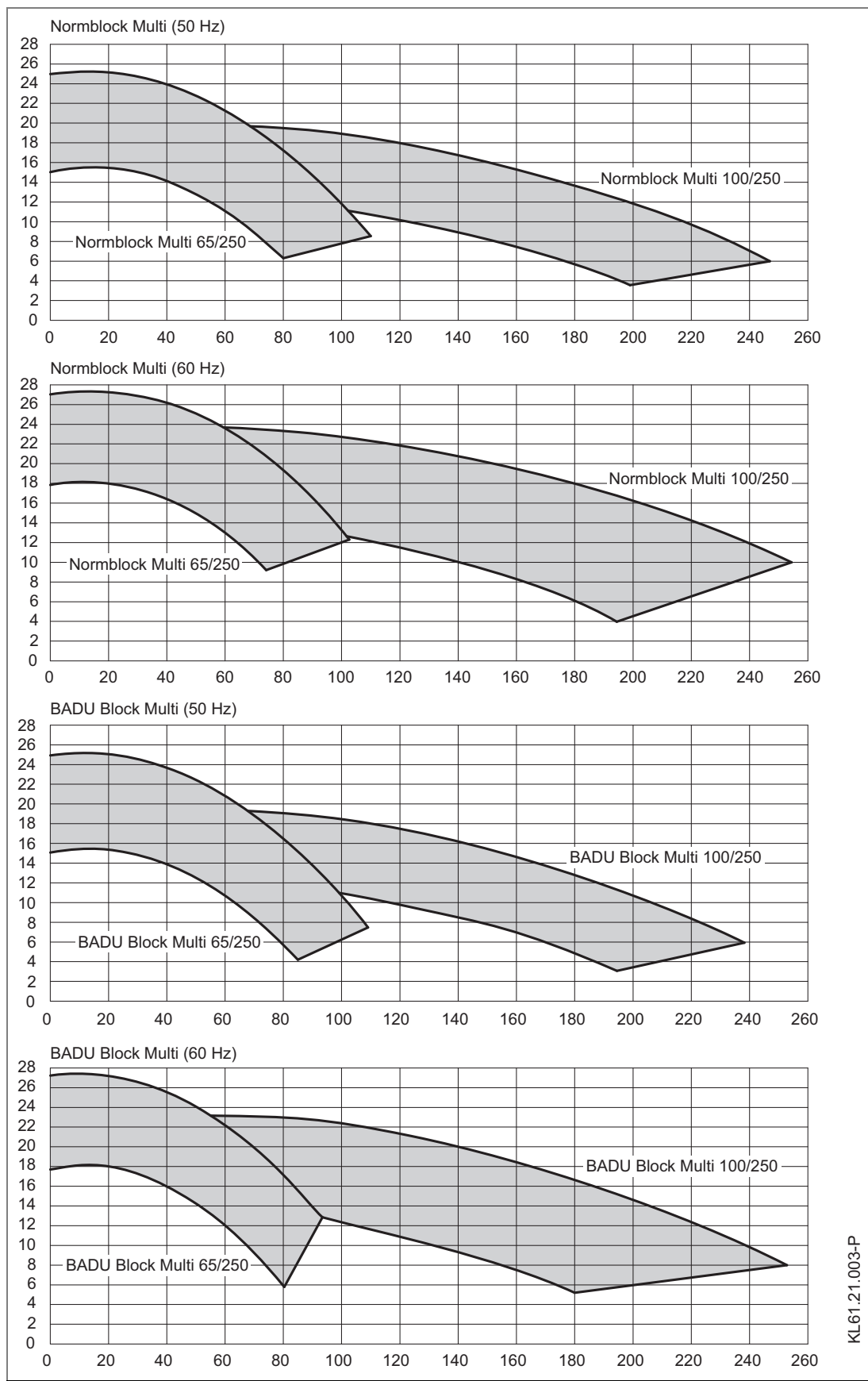
	BG 132	BG 160
i	25	25
k	306	306
l	380	380
m	300	300
n	352	352
o	Ø19	Ø19
p	400	400
q	265	265
r	259	259
t	280	280
u	235	235
v	302	302
w	202	232
y	202	232
z	175	175
L	1114	1203
D1	300	350
D2	262	314
Weight [kg]	127	154

Flanges compatible with

Sa	EN 1092-2 (PN10)		ASME
	DN	Ø200	Ø200
	D	Ø340	Ø340
	k	Ø295	Ø298.5
	d2	Ø23	Ø22,5

Da	EN 1092-2 (PN16)		ASME
	DN	Ø100	Ø100
	D	Ø225	Ø225
	k	Ø180	Ø190.5
	d2	Ø19	Ø19

10.2 Characteristics



KL61.21.003-P

Fig. 13

10.3 Exploded drawing

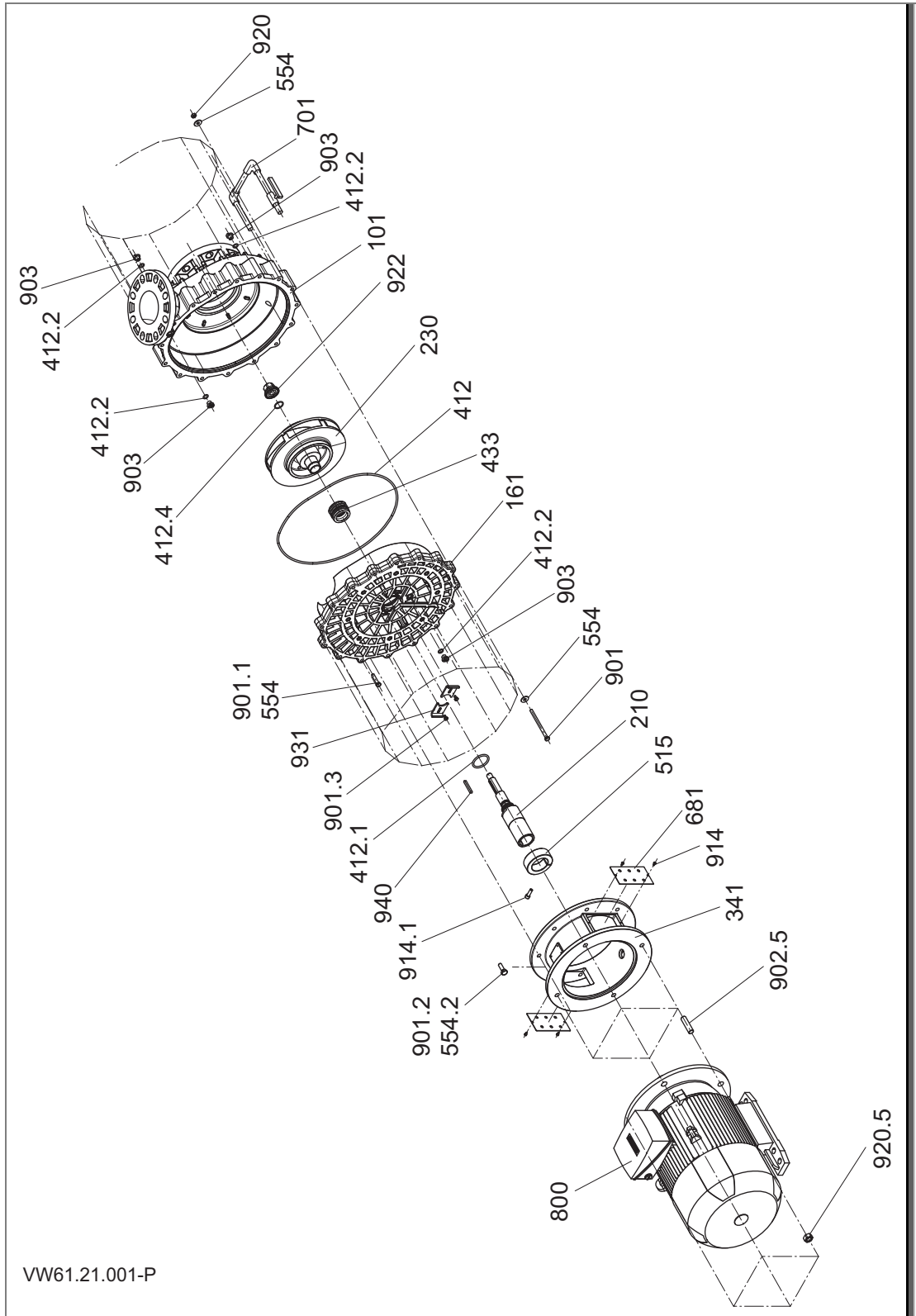


Fig. 14

Normblock Multi spare parts list

101	Pump housing	901	Hexagon screw
161	Gland housing	901.1	Hexagon screw
210	Pump shaft	901.2	Hexagon screw
230	Impeller	901.3	Hexagon screw
341	Drive lantern	902.5	Stud screw
412	O-Ring	903	Drain plug
412.1	O-Ring	914	Hexagon socket screw
412.2	O-Ring	914.1	Hexagon socket screw
412.4	O-Ring	920	Hexagon nut
433	Mechanical seal	920.5	Hexagon nut
515	Support ring	922	Impeller nut
554	Washer	931	Lockwasher
554.2	Washer	940	Shaft key
681	Coupling protection	701	Vent line with valve Rp 3/8
800	Motor		

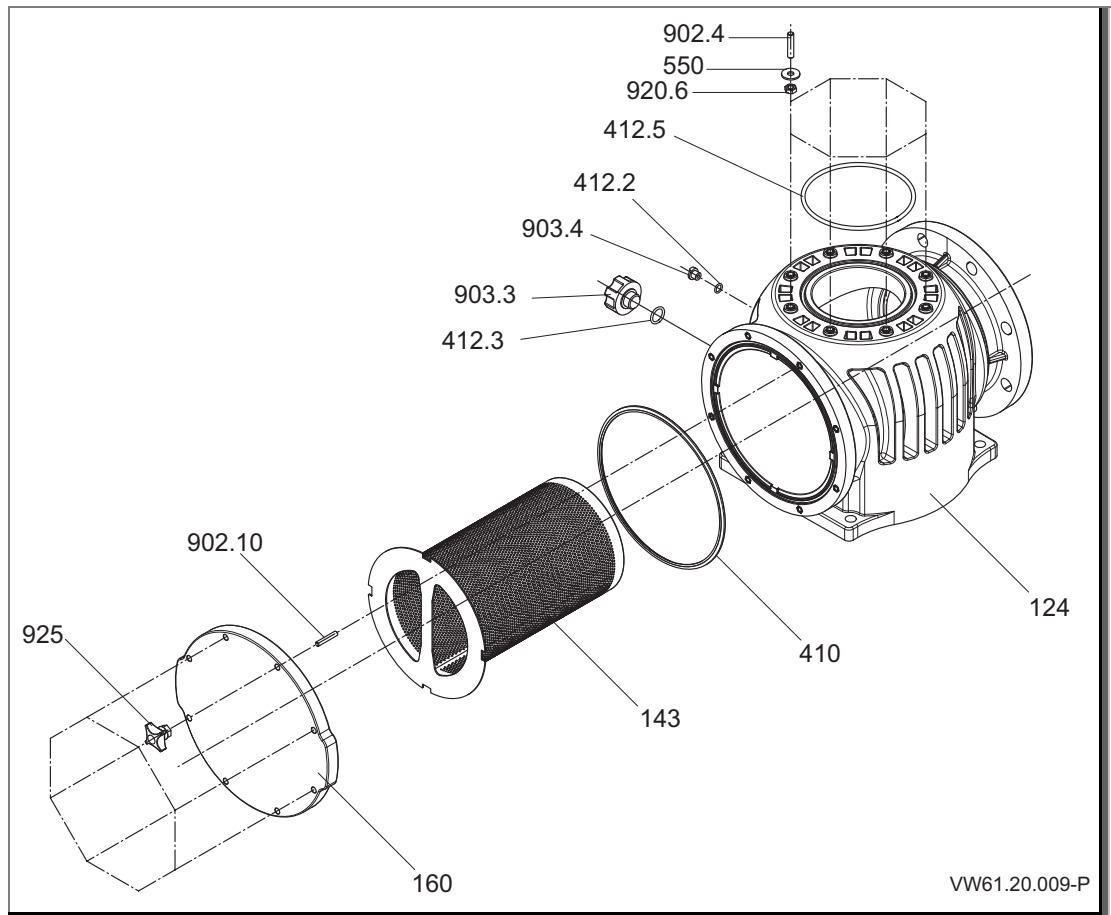


Fig. 15

Pre-filter housing spare parts list

124	Pre-filter housing	550	Washer
143	Strainer basket	902.4	Stud screw
160	Lid	902.10	Stud screw
410	Gasket	903.3	Drain plug
412.2	O-Ring	903.4	Drain plug
412.3	O-Ring	920.6	Hexagon nut
412.5	O-Ring	925	Star handle

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