Pioneering for You

Wilo-Multivert MVI120..G/150..G

en Installation and operating instructions

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Wilo-Multivert MVI120..G/150..G

Fig. 1

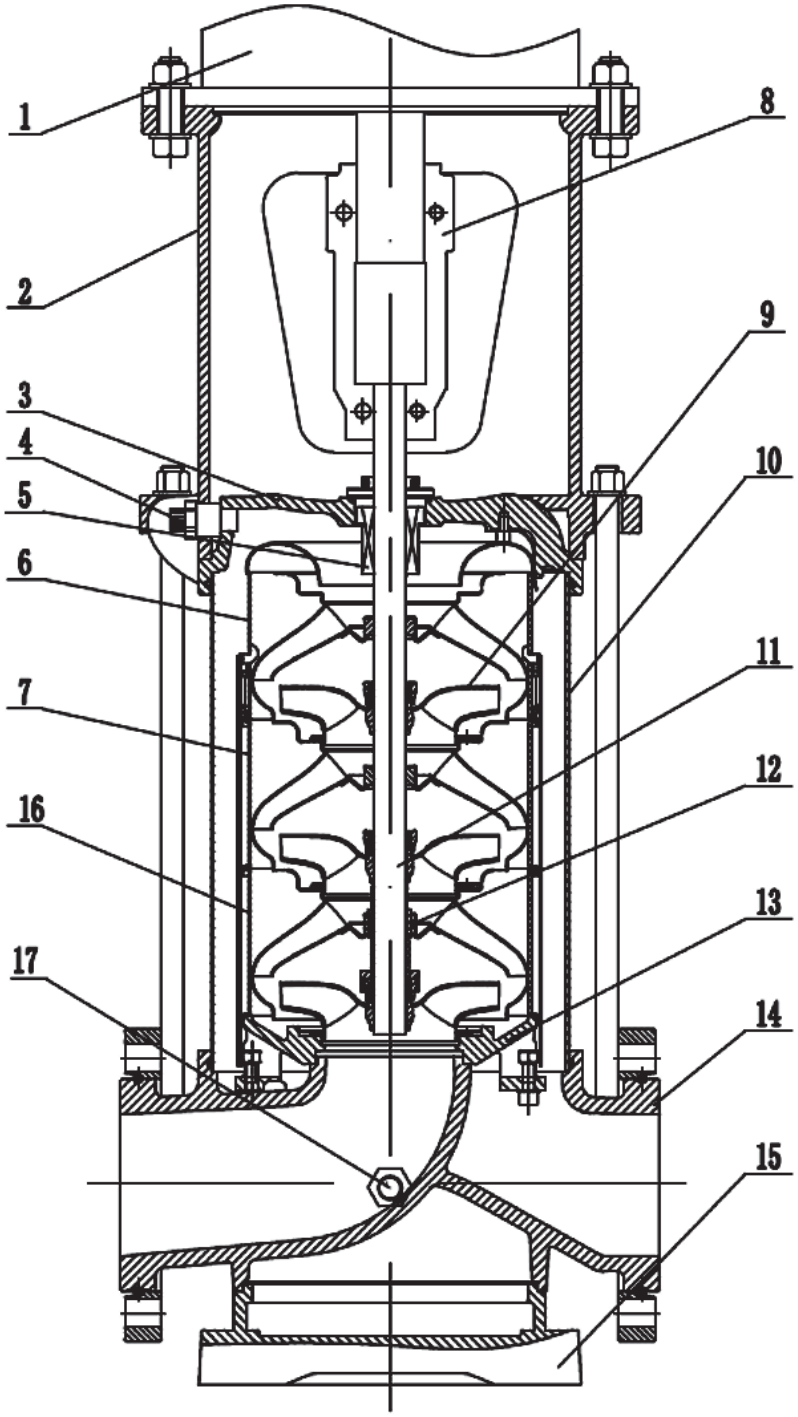

Fig. 2

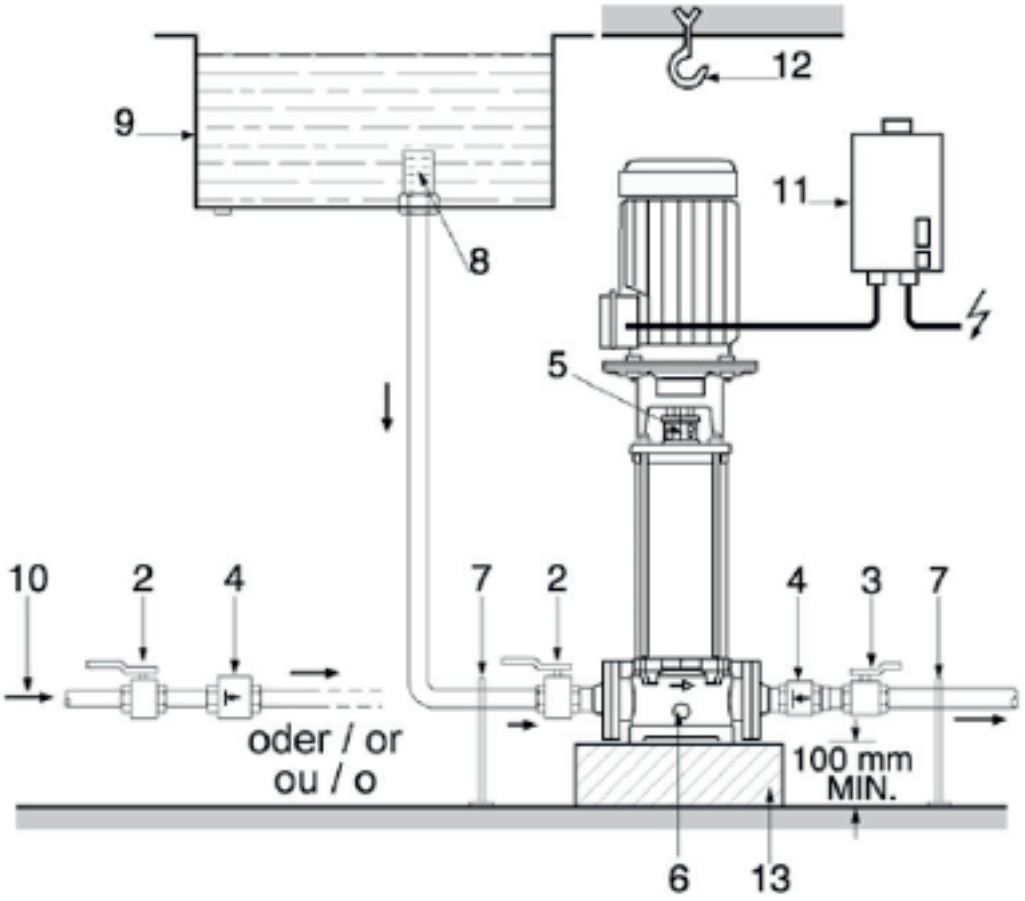
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Fig. 3

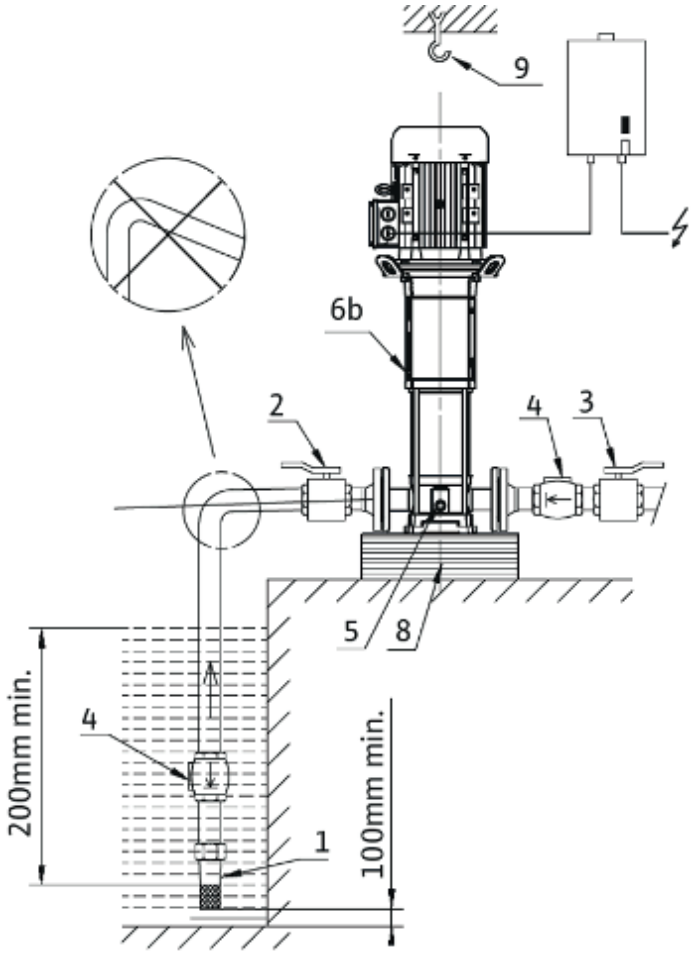
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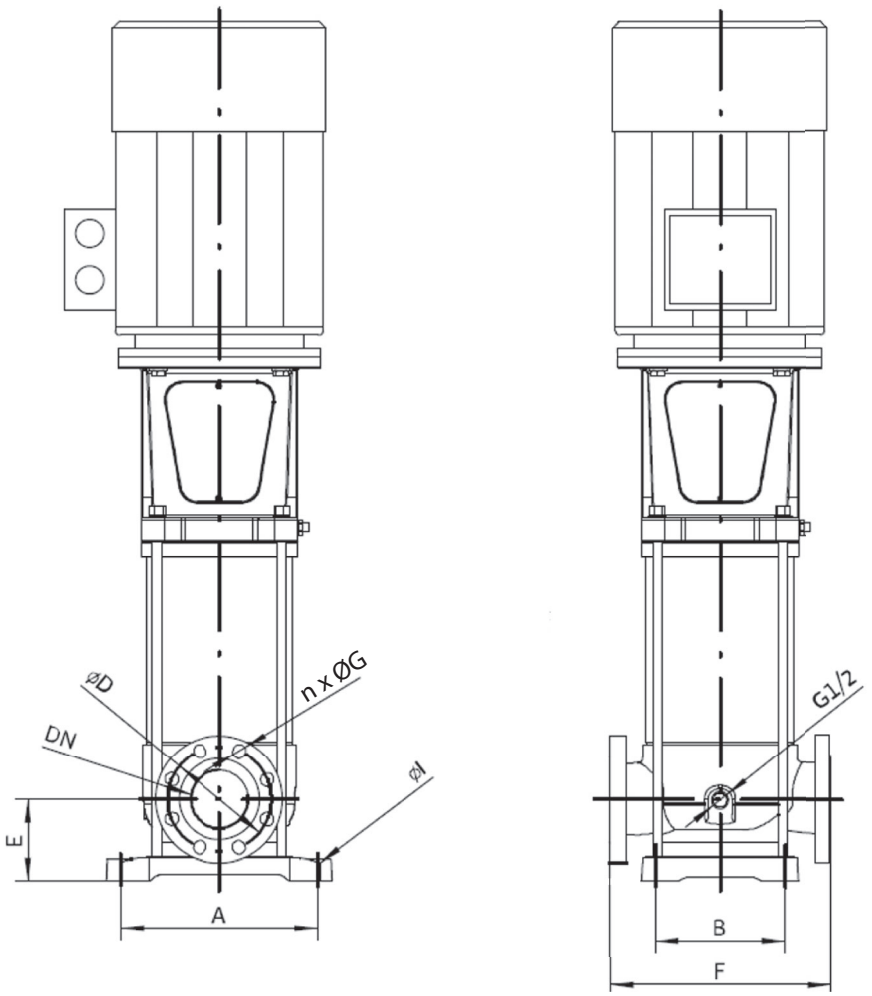
Fig. 4



Type	A	B	ØD	E	F	ØG	n	ØI
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MVI15001/1G ... MVI15008/2G								

Fig. 5

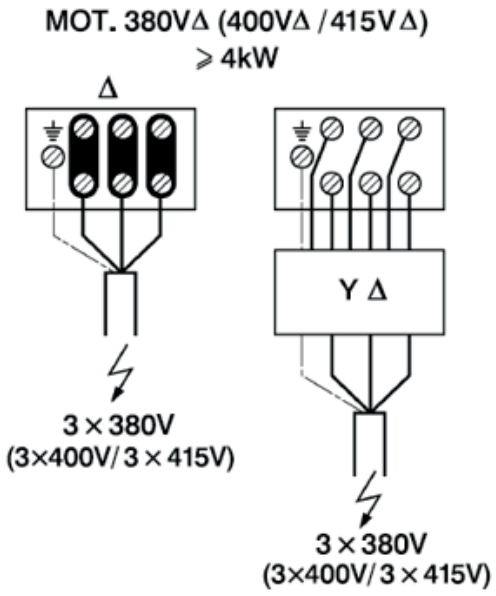


Fig. 6

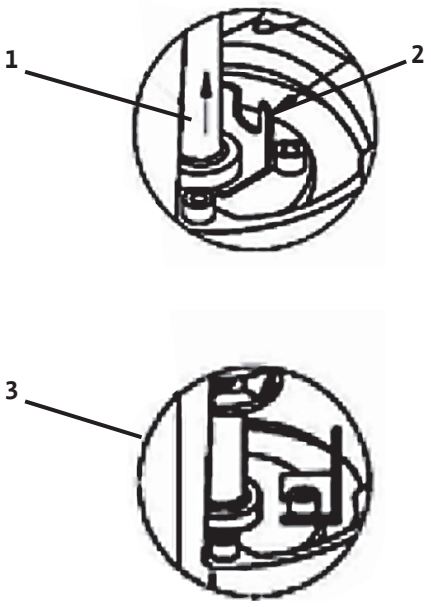
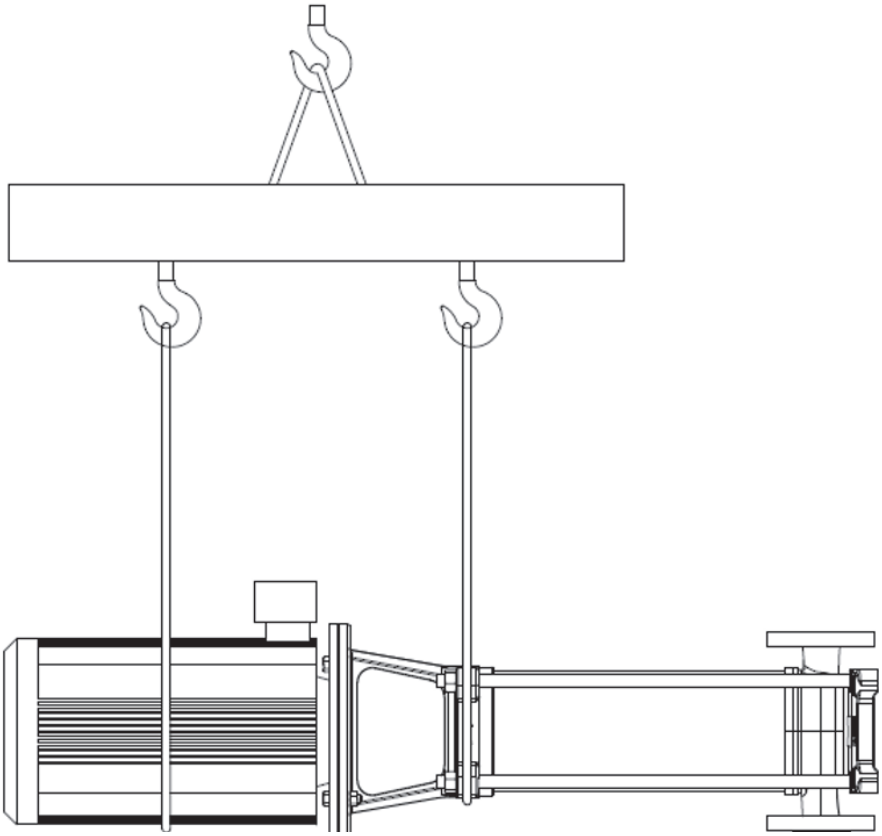


Fig. 7



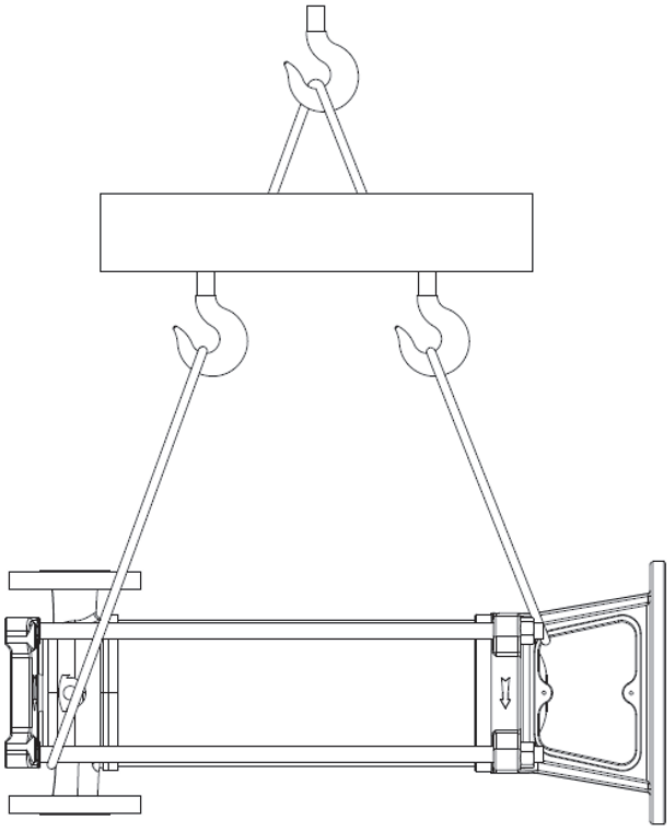


Fig. 8

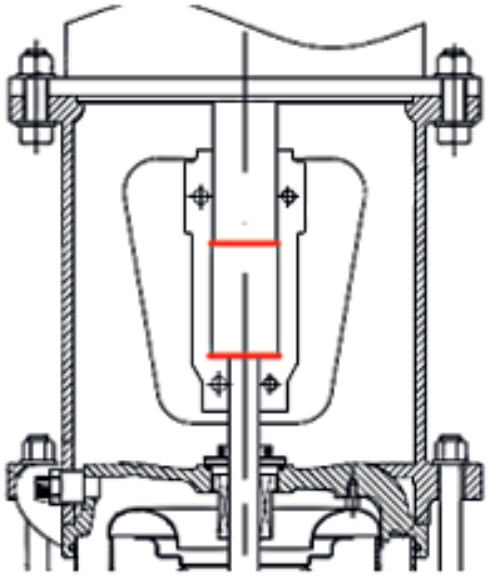


Fig. 9

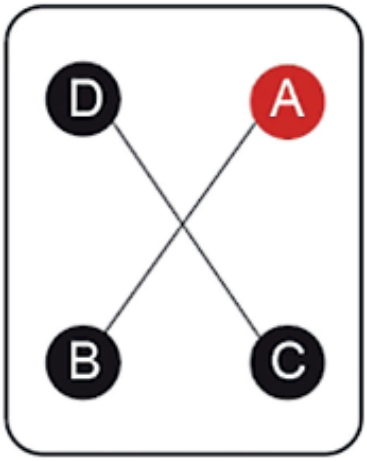
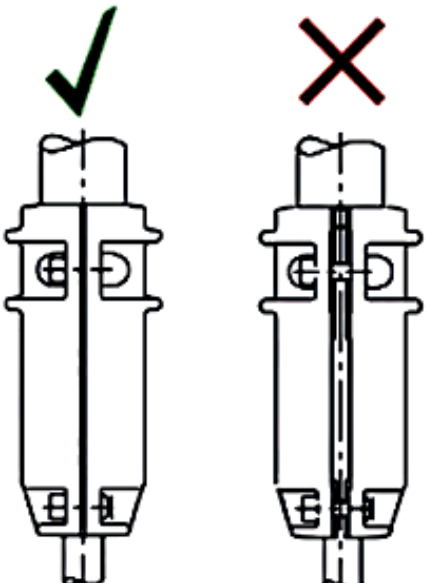


Fig. 10



Contents

1 General

1.1 About these instructions

These instructions are a part of the product. Obey the instructions for correct handling and use:

- Read the instructions carefully before doing a procedure.
- Keep the instructions easily get access to.
- Follow product specifications.
- Follow the markings on the product.

1.2 Copyright

1.3 Subject to change

Wilo reserves the right to change the listed data without prior notice and is not liable for technical inaccuracies and/or omissions. The illustrations vary from the original and are intended as a sample representation of the product.

1.4 Exclusion from warranty and liability

Wilo assumes no warranty or liability in these cases:

- Incorrect configuration because of not sufficient or incorrect instructions by the operator or the customer
- Non-compliance with these instructions
- Incorrect use of the product
- Incorrect storage or transport
- Incorrect installation or dismantling
- Not sufficient maintenance
- Not approved repairs
- Not applicable installation location
- Chemical, electrical or electrochemical causes
- Wear of product components

2 Safety

This section contains safety information for each phase of the product's life cycle. Disregarding this information leads to:

- Danger to persons
- Danger to the environment
- Damage to property
- Loss of claims for damages

2.1 Symbols and signal words in the operating instructions

Symbols:

WARNING
General safety symbol

WARNING
Electrical risks

NOTICE
Notes

Signal words

DANGER
Imminent danger.
May result in death or severe injuries if the hazard is not prevented.

WARNING
Non-observance may result in (very) severe injury.

CAUTION
The product risks becoming damaged. “Caution” is used when there is a risk to the product if the user does not observe procedures.

NOTICE
Note containing useful information for the user about the product. It assists the user in the case of an issue;

2.2 Personnel qualification

The installation, operating and maintenance personnel must have the appropriate qualifications for this work. Area of responsibility, terms of reference and monitoring of the personnel are to be ensured by the operator. If the personnel are not in possession of the necessary knowledge, they are to be trained and instructed. This can be accomplished if necessary by the manufacturer of the product at the request of the operator.

2.3 Danger in the event of non-observance of the safety instructions

Non-observance of the safety instructions can result in risk of injury to persons and damage to the environment and the product/unit. Nonobservance of the safety instructions results in the loss for any claims to damages. In particular, non-observance can, for example, result in the following risks:

- Danger to persons due to electrical, mechanical and bacteriological factors
- Damage to the environment due to leakage of hazardous materials
- Property damage
- Failure of important product/unit functions
- Failure of required maintenance and repair procedures

2.4 Safety consciousness on the job

The safety instructions included in these installation and operating instructions, the existing national regulations for accident prevention together with any internal working, operating and safety regulations of the operator are to be complied with.

2.5 Safety instructions for the user

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

- If hot or cold components on the product/unit lead to hazards, local measures must be taken to guard them against touching.
- Guards which protect personnel from coming into contact with moving components (e.g. the coupling) must not be removed while the product is in operation.

- Leakages (e.g. from the shaft seals) of hazardous fluids (which are explosive, toxic or hot) must be led away so that no danger to persons or to the environment arises. National statutory provisions are to be complied with.
- Highly flammable materials are always to be kept at a safe distance from the product.
- Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and local power supply companies must be adhered to.

2.6 Safety instructions for installation and maintenance work

The operator must ensure that all installation and maintenance work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the operating instructions

Work on the product/unit must only be carried out when at a standstill. It is mandatory that the procedure described in the installation and operating instructions for shutting down the product/unit be complied with.

Immediately on conclusion of the work, all safety and protective devices must be put back in position and/or recommissioned.

2.7 Unauthorised modification and manufacture of spare parts

Unauthorised modification and manufacture of spare parts will impair the safety of the product/ personnel and will make void the manufacturer's declarations regarding safety.

Modifications to the product are only permissible after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts will absolve us of liability for consequential events.

3 Transport and storage

3.1 Delivery

The high-pressure centrifugal pump is fixed to a pallet. The high-pressure centrifugal pump is foil-wound to prevent it against moisture and dust.

- Obey transport and storage instructions attached to the packaging
- On delivery and before removing the packaging, examine the packaging for damage.

If damage is detected because of a fall or equivalent

- Examine the pressure-boosting pump and accessories for possible damage.
- Notify the delivery company (forwarding agent) or customer service. Even if there cannot be found one obvious damage to the pressure-boosting pump or its accessories.

3.2 Transport

The high-pressure centrifugal pump is foil-wound to prevent it against moisture and dust.

- If the outer packaging is damaged or no longer present, apply applicable protection from humidity and dirt.
- Do not remove the outer packaging until you are at the installation site.
- If the pump is transported again subsequently, fit new applicable protection against moisture and contamination.
- Demarcate and cordon off the working area.
- Keep not approved persons away from the working area.
- Use approved lifting slings: Polyester webbing slings.
- Attach lifting slings to base frame.

CAUTION

Outside influences can cause damage to the pump.

If the delivered material is to be re-installed later, keep it in a dry location. Prevent it from impacts and outside influences (humidity, frost etc.). The pump must be cleaned thoroughly before it is put into temporary storage. The pump can be stored for minimum one year.

3.3 Storage

- Place the pump on a firm and even surface.
- Ambient conditions: 10 ... 40 °C, max. humidity: 90 %.
- Dry hydraulics before packing.
- Protect the pump from humidity and dirt.
- Protect the pump from direct exposure to sunlight.

4 Application/use

4.1 Intended use

This pump's basic function is to pump hot or cold water, water with glycol or other low viscosity fluids. Pumped fluids must not contain mineral oil, solid or abrasive substances, or materials having long fibres. The manufacturer's approval is necessary for use to pump corrosive chemicals.

Applications areas

- Water distribution and pressure boosting
- Industrial circulation systems
- Process fluids
- Cooling water circuits
- Firefighting and washing stations
- Irrigation systems, etc.

4.2 Incorrect use

WARNING

Risk of explosion

This pump must not be used to handle flammable or explosive liquids.

Possible misuse

The high-pressure centrifugal pump is not designed for applications that are not explicitly approved by the manufacturer.

Misuse of the pump includes, in particular:

- Pumping fluids that chemically or mechanically attack the materials used in the pump
- Pumping fluids that contain abrasive or long-fibre components
- Pumping fluids that the manufacturer has not approved

Persons under the influence of intoxicating substances (e.g. alcohol, drugs, narcotics) are not approved to operate, keep or modify the pressure-boosting pump.

Incorrect use

Incorrect use occurs when parts other than given in the intended use are processed in the pressure-boosting pump. Change of the components of the pressure-boosting pump also leads to incorrect use.

All spare parts must comply with the technical necessaries given by the manufacturer. There is no guarantee that third-party parts are designed and manufactured in accordance with applicable safety and operational necessaries. While it is always guaranteed when using original spare parts.

Changes to the pressure-boosting pump (mechanical or electrical changes to the function sequence) invalidate liability on the part of the manufacturer for caused damage. The exclusion of liability also applies to the installation and adjustment of safety devices and valves as well as to the change of load-bearing parts.

5 Product description

5.1 Description

Fig.1

1	Motor
2	Lantern
3	Upper flange
4	Venting plug
5	Mechanical seal
6	Stage housing
7	Stage housing with sleeve
8	Coupling
9	Impeller
10	Tube liner
11	Pump shaft
12	Dynamic shaft sleeve
13	Support casing
14	Pump housing
15	Baseplate
16	First stage casing
17	Drain/priming plug

Table 1: Product overview

5.2 Design

MVI..G pumps are vertical high-pressure non-self-priming pumps with inline connection based on multistage design.

MVI..G pumps mix the use of the two, high efficiency hydraulics and motors (if one).

All metallic parts in contact with water are made of stainless steel or grey cast iron. For aggressive fluid, special versions are with stainless steel only for all wetted components.

MVI..G pumps have a cartridge seal to make easier maintenance. For the heaviest motor, a special coupling lets changing this seal without removing the motor.

5.3 Type key

Example:	Wilo-Multivert MVI12007/2G-1/25/E/K/ 3-400-50xxxx
Wilo	Brand
Multivert	Product family
120	Nominal volume flow in m^3/h
07	Number of impellers
2	Number of trimmed impellers (if any)
G	Series type
1	Pump material code **1** = Pump housing stainless steel 1.4301 (AISI 304) + hydraulics 1.4301 (AISI 304) **2** = Modular pump housing stainless steel 1.4404 (AISI 316L) + hydraulics 1.4404 (AISI 316L) **3** = Pump housing cast iron EN-GJL-250 (Wilo green painting) + hydraulics 1.4301 (AISI 304)
25	Pipe connection **25** = round flanges PN 25 **40** = round flanges PN 40
E	Seal type code **E** = EPDM **V** = FKM (optional, cannot comply with drinking water regulation)
K	K = Cartridge seal
Pump with motor	
3	3 = Three-phase motor
400	Motor electrical voltage (V) 400 = 400 (V)
50	Motor frequency (Hz)
Bareshaft pump without motor	
38FF265	38 = Ø motor shaft FF265 = lantern size

5.4 Technical data

Property	Value
Maximum operating pressure	
Pump housing	25 or 40 bar, depending on the model
Maximum suction pressure	**Note:** If exceeding maximum operating pressure, the ball bearing and the mechanical seal could be damaged or lifetime could decrease. Real inlet pressure (P_{inlet}) + pressure at 0 flow delivered by the pump must be below the maximum operating pressure of the pump. $P_{Inlet} + P_{at\ 0\ volume\ flow} \leq P_{max\ pump}$ See the pump's rating plate to know the maximum operating pressure: P_{max}
Temperature ranges	
Fluid temperature	-15 °C... +120 °C 1000 rpm... 3600 rpm
Ambient temperature	-15 °C... +40 °C (other termperature on request)
Electrical data	
Motor efficiency	Motor according to IEC 60034-30 IE3/IE4
Electrical voltage	See rating plate
Frequency	See rating plate
Motor protection class	IP55
Insulation class	F

Property	Value
Temperature during transport min./max.	-30 °C ... +70 °C
Other data	
Relative humidity	≤90 %, non-condensing
Altitude	≤ 1000 m above sea level (> 1000 m on request)
Maximun suction head	According to pump's NPSH

Sound-pressure level

P_2 kW	11	15	18.5	22	30	37	45	55	75	90	110
dB(A)	74	74	77	80	84	84	86	86	86	91	92

Table 2: Sound-pressure level, 50 Hz; dB(A) 0/+3 dB(A)

Maximum number of starts per hour

P_2 kW	11	15	18.5	22	30	37	45	55	75	90	110
DOL	15	12	10	10	—	—	—	—	—	—	—
Y/Δ	25	25	20	20	20	15	15	15	12	12	10

P_2 = Pu, output power at the motor shaft

Table 3: Allowed minimum starts per hour, direct start (DOL) or Star-Delta start (Y/Δ)

5.5 Scope of delivery

- Multistage pump
  - As complete unit with motor
  - Or as bareshaft pump without motor
- Installation and operating instructions

6 Installation and electrical connection

6.1 Staff qualifications

- Electrical work: Do the electrical work only by a qualified electrician.
  Necessary knowledge: identification and prevention of electrical hazards.
- Installation and dismantling: do the work only by a specialist in sanitary facilities.
  Necessary knowledge: fastening of the buoyancy safeguard, connection of plastic pipes.

6.2 Operator responsibilities

- Obey local accident prevention and safety regulations.
- Obey regulations for working below suspended loads when using lifting accessories.
- Provide protective equipment. Make sure that the staff wears the protective equipment.
- Structural components and foundations must be sufficiently stable to allow the device to be fixed in a secure and functional manner. The operator is responsible for the provision and suitability of the structural component/foundation.
- Make sure access to the installation location.
- Obey local regulations for the installation work.
- Make sure that the available consulting documents (installation plans, installation location, inflow conditions) are full and accurate.
- Refer to the consulting documents to lay and prepare the pipes.
- To prevent the mains connection from flooding, mount the mains connection at a sufficient height.

6.3 Installation

The pump must be installed in a dry, well-ventilated and frost-free place.

CAUTION

Possible damage of the pump!

Dirt and solder drops in the pump negatively effect the pump operation.

• It is recommended that any welding and soldering work be done before installing the pump.

• Thoroughly flush the system before installing the pump.

- The pump must be installed in an easily accessible position to facilitate inspection or replacement.
- For heavy pumps, install a lifting hook (Fig. 2, item 12) above the pump in order to ease its disassembly.

WARNING

Risk of accident by hot surfaces!

The pump must be positioned so that someone cannot come into contact with the hot pump surfaces while operation.

- Install the pump in a dry place protected from frost, on a flat concrete block using appropriate accessories. If possible, use an insulating material under the concrete block (cork or reinforced rubber) to avoid any noise and vibration transmission into the installation.

WARNING

Risk of fall!

The pump must be correctly screwed to the ground.

- Place the pump where it will be easy to reach, to facilitate inspection and removal work. The pump must always be installed perfectly upright on a sufficiently heavy concrete base.

WARNING

Risk of parts inside the pump!

Take care to remove closure members of the pump housing before installation.

NOTICE

Each pump could be tested regarding hydraulic features in factory, some water may remain in them. It is recommended for hygienic purposes, to carry out a rinsing of the pump before any using with potable water supply.

- The installation and connection dimensions are given Fig. 4.
- ▪ Lift the pump carefully according to the figures Fig.7. If necessary use a hoist and suitable slings according to the current hoist guidelines.

WARNING

Risk of fall!

Take care to pump fixations especially for the highest pumps whose centre of gravity may lead to risk during pump handling.

WARNING

Risk of fall!

Use integrated rings only if they are not damaged (no corrosion ...). Replace them if needed.

WARNING

Risk of fall!

The pump must be never carried by using motor hooks: these are only designed to lift the motor alone.

6.4 Pipe connection

- Connect the pump to the pipes by using appropriate counter-flanges, bolts, nuts and gaskets.

CAUTION

Do not use an impact wrench.

- The circulation sense of the fluid is shown on the identification label of the pump.
- The Pump must be installed in such a way that it is not stressed by the pipework. The pipes must be attached so that the pump does not bear their weight.
- It is recommended that isolation valves be installed on the suction and discharge side of the pump.
- Use of expansion joints may mitigate noise and vibration of the pump.
- As regards the nominal cross-section of the suction pipe, we recommend a cross-section minimum as large as that of the pump connection.
- A non-return valve could be placed on the discharge pipe to prevent the pump against hammer shock.
- For direct connection to a public drinking water system, the suction pipe must also have a non-return valve and a guard valve.
- For indirect connection via a tank, the suction pipe must have a strainer to keep any impurities out of the pump and a non-return valve.

6.5 Assembly of motor and bareshaft pump

- Remove coupling guards.
- Install the motor on the pump by using screws or bolts, nuts and handling devices (FF lantern size – see product designation) provided with the pump: check motor power and dimension in Wilo catalogue
- Coupling assembling: When installing, ensure that the coupling is flush with the motor shaft and the pump shaft (see Fig.8).
- Tighten the torque wrench in the order A, B, C, and D shown in (Fig. 9), tighten torque is 100 Nm for M 16 bolt.
- After the installation is complete, check whether the gap between the two sides of the cou-pling is consistent. (Fig.10) .

NOTICE

Depending on fluid characteristics, motor power could be modified.

Contact The Wilo Customer Services if necessary.

- Close the coupling guards by screwing all screws provided with the pump.

6.6 Electrical connection

WARNING

Electrical shock hazard!

Dangers caused by electrical energy must be removed.
• Electrical work by a qualified electrician only!
• All electrical connections must be done after the electrical supply has been switched off and secured against not approved switching.
• For safe installation and operation, a correct grounding of the pump to the power supply's grounding terminals is necessary.

- Check that operating current, voltage and frequency used comply with motor plating data.
- The pump must be connected to the power supply by a solid cable equipped with a grounded plug-connection or a main power switch.
- Three-Phase motors must be connected to an approved safety switch. The set nominal current must correspond to the electrical data on the motor name plate.
- The supply cable must be laid so that it never touches the pipework and/or the pump and motor casing.
- The pump/installation must be grounded in compliance with local regulations. A ground fault interrupter can be used as extra protection.
- The mains connection must be in accordance with the connection plan (Fig. 5).
- ▪ It is recommended to prevent three-phase motors by a circuit breaker for the IE class of the motors. Adapt the current adjustment to the pump use.

6.7 Operation with frequency converter

- Motors used can be connected to a frequency converter in order to adapt pump performance to duty point.
- The converter must not generate voltage peaks at motor terminals higher than 850V and dU/dt slope higher than 2500 V/µs.
- If higher values, an appropriate filter must be used: contact converter manufacturer for this filter definition and selection.
- Strictly follow instructions provided by the converter manufacturer data sheet for installation.
- Do not set the minimum variable speed below 50% of pump nominal speed.

7 Commissioning

7.1 Pump filling - Venting

CAUTION

Possible damage of the pump!

Never operate the pump dry.
The system must be filled before starting the pump.

Air evacuation process – Pump with sufficient supply pressure (Fig. 3)

- Close the two guard valves (2, 3).
- Unscrew the venting screw from filling plug (Fig. 1, item 4).
- Slowly open the guard valve on the suction side (2).
- Retighten the venting screw when air comes out at the venting screw and the pumped liquid flowing out (Fig. 1, item 4).

WARNING

Risk of scalding!

When the pumped liquid is hot and the pressure high, the stream escaping at the venting screw may cause burns or other injuries.

- Open the guard valve on the suction side fully (2).
- Start the pump and make sure the direction of rotation is the one printed on pump plating. If this is not the case, change two phases in the terminal box.

CAUTION

Possible damage of the pump

A wrong direction of rotation will cause bad pump performances and possibly coupling damage.

- Open the guard valve on the discharge side (3).

Air evacuation process – Pump in suction (Fig. 3)

- Close the guard valve on the discharge side (3).
  Open the guard valve on the suction side (2).
- Remove the filling plug (Fig. 1, item 4).
- Open the drain-priming plug not fully (Fig. 1, item 17).
- Fill the pump and the suction pipe with water.
- Make sure that there is no air in the pump and in the suction pipe: Refilling is required until air has been fully removed.
- Close the filling plug (Fig. 1, item 4).
- Start the pump and make sure the direction of rotation is the one printed on pump plating. If this is not the case, change two phases in the terminal box.

CAUTION

Possible damage of the pump

An incorrect direction of rotation causes bad pump performances and possibly coupling damage.

- Open the guard valve on the discharge side a little (3).
- Unscrew the air bleed screw from the filling plug for air venting (6a).
- ▪ Retighten the venting screw when air comes out at the venting screw and the pumped liquid flows (Fig. 1, item 4).

WARNING

Risk of scalding

When the pumped liquid is hot and the pressure high, the stream escaping at the air bleed screw may cause burns or other injuries.

- Open the guard valve on the discharge side fully (3).
- Close the drain-priming plug (Fig. 1, item 17).

7.2 Starting up

CAUTION

Possible damage of the pump

The pump must not operate at zero flow (closed discharge valve).

WARNING

Risk of injury!

When the pump runs, coupling guards must be in position, tightened with all applicable screws.

WARNING

important noise

The noise given out by the most powerful pumps could be high: Protection must be used when staying near the pump for long times.

CAUTION

Possible damage of the pump

Installation must be designed in order that no one could be hurt in case of fluid leakage (mechanical seal failure ...).

8 Shutdown

If maintenance or repair, switch off the pump as follows:

- Switch off the power supply and secure it against not approved switching.
- Close the shut-off valve upstream and downstream of the pump.
- Completely drain the pump if necessary.

In the event of long standstill or frost:

- Drain the pump by removing the lower drain plug from the pump.
- Close the protective valves.
- Fully open the drain/priming plug and the air-bleed screw.

9 Maintenance

Only an approved service representative must do all servicing!

DANGER

Electrical shock hazard!

Dangers caused by electrical energy must be removed.
All electrical work must be done after the electrical supply has been switched off and secured against not approved switching.

WARNING

Risk of scalding!

At high water temperatures, and system pressure close isolating valves be-fore and after the pump. First, let the pump cool down.

These pumps are of low-maintenance. But a regular examination is recommended all or each 15,000 hours.

In option, the mechanical seal is easily replaceable on some models thanks to its cartridge seal design.

- When the mechanical seal position is set, put the cartridge seal's adjusting wedge (mechanical seal fork) in its housing (Fig. 6).
- Always keep the pump perfectly clean.

Service life: 10 years depending on the operating conditions and if all necessaries de-scribed in the operation manual have been met.

10 Faults, causes and remedies

DANGER

Electrical shock hazard!

Dangers caused by electrical energy must be ex-cluded.
All electrical work must be performed after the elec-trical supply has been switched off and secured against unauthorized switching.

WARNING

Risk of scalding!

At high water temperatures and system pressure close isolating valves before and after the pump. First, allow pump to cool down.

Faults	Cause	Remedies
Pump does not run	No current	Examine the fuses, the wiring, and the connectors
	The thermistor tripping device has tripped out, cutting off power	Prevent any cause of overload-ing of the motor
Pump runs but delivers too little	Incorrect dir-ection of rota-tion	Examine the direction of rota-tion of the motor and correct it if necessary
	Foreign bodies clogged the pump	Examine and clean the pipe
	Air in suction pipe	Make the suction pipe airtight
	Suction pipe too narrow	Install a larger suction pipe
	The valve is not open far enough	Open the valve properly
Pump delivers unevenly	Air in pump	Remove the air in the pump; make sure that the suction pipe is airtight. If necessary: Start the pump for 20- ... 30 s. → Open the air bleed screw to move air away. → Close the air bleed screw. → Do it several times until no more air is going out of the pump
Pump vibrates or is noisy	Foreign bodies in pump	Remove the foreign bodies
	Pump not properly at-tached to ground	Retighten the screws
	Bearing dam-aged	Call the Wilo Customer Service
Motor over-heats, its pro-tection trips out	A phase is open-circuit	Examine the fuses, the wiring, and the connectors
	Ambient tem-perature too high	Provide cooling
Mechanical seal is leaking	Mechanical seal is dam-aged	Replace the mechanical seal

If the fault cannot be solved, please contact the Wilo customer services.

11 Spare parts

All spare parts should be ordered directly from the Wilo customer service. To prevent errors, always quote the data on the pump's rating plate when making an order. The spare parts catalogue is available at www.wilo.com

12 Disposal

Information on the collection of used electrical and electronic products.

Proper disposal and appropriate recycling of this product prevents damage to the environment and dangers to your personal health.

NOTICE

Disposal as domestic waste is forbidden!

In the European Union, this symbol can appear on the product, the packaging or the accompanying documentation. It means that the electrical and electronic products in question must not be dis-posed of along with domestic waste.

To ensure proper handling, recycling and disposal of the used products in question, please note the following points:

- Only hand over these products at designated, certified collect-ing points.
- Observe the locally applicable regulations! Please consult your local municipality, the nearest waste disposal site, or the dealer who sold the product to you for information on proper disposal. For further information on recycling, go to www.wilo-recyc-ling.com.

Subject to change without prior notice.

wilo

Local contact at
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