

en **Volute Casing Pumps**  
**Model: LER, LERS, LEZ**

Installation, Operation and Maintenance Instruction

Translation of the Original Operation Manual



en **Keep for further use !**  
Pay attention to this operating instruction before the delivery, installation, start-up a.s.o.!

**EC Declaration of Conformity** (valid only for Xylem Service Austria GmbH aggregate supplied in its entirety, according to **EC Directive on Machinery 2006/42/EC, Annex II A**)



The manufacturer,  
**Xylem Service Austria GmbH**  
**Ernst Vogel-Strasse 2**  
**2000 Stockerau**  
**Austria**

of the pump unit (from the standard product line) hereby declares:

**LER 100-125, LER 125-160, LER 125-200, LER 150-200, LER 150-200, LER 150-250, LER 200-200, LER 200-250, LER 200-270, LER 200-315, LER 250-315, LER 250-350, LER 250-400, LER 300-350, LER 300-400, LER 300-450, LER 300-480,**  
**LEERS 100-125, LEERS 125-160, LEERS 125-200, LEERS 150-200, LEERS 150-200, LEERS 150-250, LEERS 200-200, LEERS 200-250, LEERS 200-270, LEERS 200-315, LEERS 250-315, LEERS 250-350, LEERS 250-400, LEERS 300-350, LEERS 300-400, LEERS 300-450, LEERS 300-480,**  
**LEZ 100-125, LEZ 100-160, LEZ 125-160, LEZ 125-200, LEZ 200-200, LEZ 200-250, LEZ 200-270, LEZ 200-315, LEZ 250-315, LEZ 250-350, LEZ 250-400**

that the above mentioned pump unit complies with all regulations of these guidelines in their current version:

**EC-Directive 2006/42/EC "Machinery"**  
**EC-Directive 2009/125/EC "Ecodesign" and**  
**Commission Regulation (EC) No. 547/2012**  
**EC-Directive 2004/108/EC "EMC"**

The technical documentation created by Directive 2006/42/EC, Annex VII A.

The aforementioned technical documentation get submitted upon request to the competent authority in electronic form on data storage medium.

Responsible for compiling the technical documentation:

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**Abtlg. Research & Development**  
**Xylem Service Austria GmbH**  
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Among others, the following harmonised standards have been applied:

**EN 809 :1998+A1:2009+AC:2010(D)**  
**EN 953 :1997+A1:2009(D)**  
**EN ISO 12100 :2010(D)**  
**EN 60204-1 :2006/A1:2009 D**

A change to an aggregate which was not approved by us invalidates this declaration. This also applies in the case that the aggregate is installed in equipment that does not have the declaration of conformity in accordance with the Directive on Machinery, 2006/42/EC.

Stockerau, 05.07.2013

.....  
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

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## Name Plate

Type					
No.		PN		Ø	
$m^3/h$		m		$^{\circ}C$	
Motor		3~ Hz		min <sup>-1</sup> SI	
Y 		V A		P <sub>2N</sub> kW	
Δ 		V A		cos φ	
Pumpenfabrik Ernst Vogel GmbH A-2000 Stockerau / Austria		ITT Industries		Isol.F	
				CE	

All LER & LEZ pumps are shipped with a 304SS (1.4301) nameplate. This nameplate provides the customer with necessary information regarding the construction and performance capabilities of the subject pump. This nameplate also contains critical information that should be provided when ordering spare parts at any time during the life of the pumps.

## 1. General

This product corresponds with the requirements of the Machine directive 2006/42/EG.



The staff employed on installation, operation, inspection and maintenance must be able to prove that they know about the relevant accident prevention regulations and that they are suitably qualified for this work. If the staffs do not have the relevant knowledge, they should be provided with suitable instruction.

The operation safety of the delivered pump resp. unit (= pump with motor) can only be guaranteed on designated use according to the attached data sheet and / or order confirmation resp. chapter 6 "Start-up, Operation, Shut down".

The operator is responsible for following the instructions and complying with the safety requirements given in these Operating Instructions.

Smooth operation of the pump or pump unit can only be achieved if installation and maintenance are carried out carefully in accordance with the rules generally applied in the field of engineering and electrical engineering.

If not all the information can be found in these Operating Instructions, please contact us.

The manufacturer takes no responsibility for the pump or pump unit if the Operating Instructions are not followed.

These Operating Instructions should be kept in a safe place for future use.

If this pump or pump unit is handed on to any third party, it is essential that these Operating Instructions and the operating conditions and working limits given in the Confirmation of Order are also passed on in full.

These Operating Instructions do not take into account all design details and variants nor all the possible chance occurrences and events which might happen during installation, operation and maintenance.

We retain all copyright in these Operating Instructions; they are intended only for personal use by the owner of the pump or the pump unit. The Operating Instructions contain technical instructions and drawings which may not, as a whole or in part, be reproduced, distributed or used in any unauthorised way for competitive purposes or passed on to others.

### 1.1 Guarantee

The guarantee is given in accordance with our Conditions of Delivery and / or the confirmation of order.

Repair work during the guarantee period may only be carried out by us, or subject to our written approval. Otherwise the guarantee ceases to apply.

Longer-term guarantees basically only cover correct handling and use of the specified material. The guarantee shall not cover natural wear and tear and all parts subject to wear, such as impellers, shaft sealing, shafts, shaft sleeves, bearings, wear rings etc. or damage caused by transport or improper handling.

In order for the guarantee to apply, it is essential that the pump or pump unit is used in accordance with the operating conditions given on the name plate, confirmation of order and in the data sheet. This applies particularly for the endurance of the materials and smooth running of the pump and shaft sealing.

If one or more aspects of the actual operating conditions are different, we should be asked to confirm in writing that the pump is suitable.

## 2. Safety Regulations

These Operating Instructions contain important instructions which must be followed when the pump is assembled and commissioned and during operating and maintenance. For this reason, these Operating Instructions must be read by the skilled staff responsible and / or by the operator of the plant before it is installed and commissioned, and they must be left permanently available at the place where the pump or pump unit is in use.

**These Operating Instructions do not refer to the General Regulations on Accident Prevention or local safety and / or operating regulations. The operator is responsible for complying with these (if necessary by calling in additional installation staff).**

Equally, instructions and safety devices regarding handling and disposal of the pumped media and/or auxiliary media for flushing, lubrication a.s.o., especially if they are explosive, toxic, hot a.s.o., are not part of this operating instruction.

For the competent and prescribed handling only the operator is responsible.

### 2.1 Marking of References in the Operating Instructions

The safety regulations contained in these Operating Instructions are specially marked with safety signs acc. to DIN 4844:



#### Safety reference!

Non-observance can impair the pump and its function.



#### General Symbol for Danger!

Persons can be endangered.



#### Warning of electric voltage!

Safety instructions attached directly to the pump resp. unit must be followed under any circumstances. Further they must be kept in good readable condition.

**In the same way, as these Operating Instructions of the pump, all possibly attached Operating Instructions of accessories (e.g. motor) must be noticed and kept available.**

## 2.2 Dangers of non-observance of the Safety Instructions

**Non-observance of the Safety Instructions can lead to loss of any claim for damages.**

Further, non-observance can lead to following risks:

- Failure of important functions of the machine or facility.
- Failure of electronic appliances and measuring instruments by magnetic fields.
- Endangering of persons and their personal property by magnetic fields.
- Endangering of persons by electric, mechanic and chemical influences.
- Endangering of environment through leakage of dangerous substances.

## 2.3 Safety Instructions for the Operator / Worker

- Depending on the operating conditions, wear and tear, corrosion or age will limit the working life of the pump/pump unit, and its specified characteristics. The operator must ensure that regular inspection and maintenance are carried out so that all parts are replaced in good time, which would otherwise endanger the safe operation of the system. If abnormal operation or any damage is observed, the pump must cease operation immediately.
- If the breakdown or failure of any system or unit could lead to people being hurt or property being damaged, such system or unit must be provided with alarm devices and/or spare modules, and they should be tested regularly to ensure that they function properly.
- If there is any risk of injury from hot or cold machine parts, these parts must be protected against contact by the user, or suitable warning signs must be affixed.
- Contact protection on moving parts (e.g. coupling guards) must not be removed from systems that are in operation.
- If the sound level of a pump or pump unit is above 85 dB(A) an ear protection has to be used when staying near the pump for some time.
- If dangerous media (e.g. explosive, toxic, hot) leak out (e.g. from shaft seals), these must be directed away so that there is no danger to people or the environment. The provisions of the law must be observed.
- Measures should be taken to exclude any danger from electricity (e.g. by complying with the local regulations on electrical equipment). If work is carried out on live electrical components, they should be unplugged from the mains or the main switch turned off and fuse unscrewed. A motor protection switch is to be provided.

## 2.4 Safety Instructions for Maintenance, Inspections and Mounting Work

- The operator is responsible that any maintenance, inspections and mounting work is made by authorized competent personnel, which must be informed by having read the Operating Instructions.
- Basically, all work on the pump or pump unit should only be carried out when the pump is stationary and not under pressure. All parts must be allowed to return to ambient temperature. Make sure that no-one can start the motor during such work. It is essential that the procedure for stopping the system described in the Operating Instructions is observed. Pumps or pump systems that carry media that are dangerous to health must be decontaminated before being taken apart. Safety Data Sheets for the various liquids handled. Immediately after finishing work, all safety and protective devices must be replaced or restarted.

## 2.5 Unauthorized Alteration and Spare Parts Production

Alteration or changes of the machine are permitted after agreement with the manufacturer.

Original spare parts and accessory authorized by the manufacturer are serving the safety.

The use of other parts can lead to loss of liability for therefrom resulting consequences.

## 2.6 Undue Operation

The operating safety of the delivered machine can only be guaranteed by designated use acc. to the following chapters of the Operating Instructions.

The limits stated in the data sheet and / or order confirmation must not be exceeded under any circumstances.

## 2.7 Use acc. to Regulations

### 2.7.1 Speed, Pressure, Temperature



Suitable safety measures must be taken at the plant to ensure that the speed, pressure and temperature of the pump and the shaft sealing do not exceed the limit values given in the data sheet and / or order confirmation. The given admission pressures (system pressures) must also be sufficiently high.

Further, pressure shocks, as can occur on too fast shut down of the facility, must be kept away from the pump (e.g. by non-return valve at pressure side, air tanks). Quick temperature changes must be avoided. They could cause a temperature shock and lead to damage or impair the function of single components.

### 2.7.2 Permitted Nozzle Loads and Torques



Basically the suction and discharge piping must be designed in such way, that as little forces as possible are effective to the pump. If that is not possible, the values shown in chapter 3.5 must not be exceeded under any circumstances. This is valid for the operation as well as for the standstill of the pump and therefore for all possible pressures and temperatures of the unit.

### 2.7.3 NPSH



The pumped liquid must have a min. pressure NPSH at the impeller inlet; so that cavitations free work is secured resp. a "break off" of the pump flow is prevented. This condition is fulfilled, when NPSH-value of the system (NPSHA) lies above NPSH-value of the pump (NPSHR) under all operating conditions.

Attention must especially be paid to the NPSH-value on pumping liquids near the vapour pressure. If the NPSH-value of the pump remains under, this can lead from damage of the material due to cavitations to destruction by overheating.

The NPSH-value of the pump (NPSHR) is shown in the curves of every pump type.

### 2.7.4 Back Flow

In systems where pumps are operating in closed circuits under pressure (gas cushions, steam pressure), the pressure of the gas cushion must not be reduced via the pump, since the back flow speed may be much higher than the operating speed, which would destroy the unit.

## 3. Description

### 3.1 Design

The pumps of **Model LER, LERS** and **LEZ** are single-stage In-line pumps with suction and discharge nozzle „in-line“ with identical pipe diameter and a common end-to-end pump-motor-shaft (Mono-Block-Design).

#### Model LER and LERS:

In-line pump with closed radial impeller in block design with attached motor.

#### Model LEZ:

In-line pump with closed radial impeller in block design with attached motor.

The model LEZ is a twin pump with 2 identical driving units, common pump casing and an integrated flap valve on discharge side.



These pumps are not qualified for dangerous or inflammable fluids. Not qualified for the operation in areas subject to explosion hazards.

The permitted application conditions and design details of the delivered pump are shown in the attached data sheet and / or the order confirmation (see Design Coding System in chapter 3.2).

#### 3.1.1 Solids

In general the models **LER, LERS** and **LEZ** are suited to handle a limited number of solids. Whether or not it can handle a given application largely depends on the abrasive nature, the concentration and the solid size of the solids.

It is not allowed to exceed a solid concentration of 25 mg/l up to max. 50 mg/l and a solid size of 0,1 mm up to max. 0,3 mm. But inside these limits it must be calculated with higher wear depending on the abrasive nature of the solids.

#### 3.1.2 Viscosity Limits

In general these models are capable of pumping viscous liquids. The maximum viscosity limit is appr. 100 cP.

#### 3.1.3 Installation position

The small pump units up to 15 kW motor power can get installed directly without support foot in the piping, but for safety reasons the motor arrangement down respectively the terminal box down is not allowed.

A support foot must be used for big pumps. For the condition of the base frame see chapter 5.1.

The appropriate sectional drawing of the supplied pump as well as the complete weight of the pump unit is shown in the appendix.

### 3.2 Design Coding System

Due to the coding on data sheet and / or order confirmation all information regarding der delivered pump can be found in this Installation, Operation and Maintenance Instruction, e.g.:

**LER** 250 - 400 U1 N L 900 4  
(0) (1) (2) (3) (4) (5) (6) (7)

Position (0) - Name of the basic Model:

LER - Single unit up to 10 bar / 120 °C

LERS - Single unit up to 16 bar / 150 °C

LEZ - Twin unit up to 10 bar / 120 °C

Position (1) - Suction and discharge nozzle in mm

Position (2) - Nominal impeller diameter in mm

Position (3) - Design of the shaft sealing

Single mechanical seal acc. DIN 24960 I1k / EN 12756 Form U, unbalanced

**Exception:** Ø18- and Ø32mm seals are not acc. DIN 24960 I1k / EN 12756; Ø75mm PN16 seal is form "B", balanced



U1 carbon / silicon carbide / EPDM (BQ1EGG)

**Exception:** Ø65- and Ø75mm seal carbon / ceramics / EPDM

U2 carbon / silicon carbide / viton (BQ1VGG)

U3 silicon carbide / silicon carbide / viton (Q1Q1VGG)

Position (4) - Impeller material

N = Cast iron (0.6020)

L = Ductile iron (0.7040) - only for pump size DN 300

Position (5) - Pump casing material

N = Cast iron (0.6020)

L = Ductile iron (0.7040)

Other materials are not available

Position (6) - Motor power (in 1/10 kW)

Position (7) - Number of motor contacts -

2 pole = 2900 rpm, 4 pole = 1450 rpm,

6 pole = 950 rpm

### 3.3 Shaft Sealing

#### 3.3.1 Structure of the mechanical seal

This shaft seal is a single mech. seal with installation dimensions according to EN 12756 (DIN 24960) form "U". No additional flushing of the seal chamber is necessary. The seal casing where the mechanical seal is located must always be filled with liquid.

For a description of materials and operational ranges of the mech. seals supplied, please refer to the data sheet in the Operation Instructions and order confirmation.

For the internal structure of the mechanical seal see the following sectional drawings.

#### 3.3.2 General information



The reuse of mech. seals that have already been used for a longer time can lead to leaking at the seal faces after reinstallation. Therefore the replacement of the mech. seal with a new one is recommended. The removed mechanical seal can be reconditioned by the manufacturer and serve as a replacement mech. seal.

#### 3.3.3 Information for the mounting



Pay attention to the utmost cleanness! Especially the seal faces must be clean, dry and undamaged. Don't apply lubrication on the seal faces of the mech. seal.

- If a lubricant is provided with the replacement mech. seal, you should use this.



Use mineral grease or oil only if you are completely sure that the elastomers of the mech. seal are oil resistant. Use no silicone.



Use only lubricants with which you are certain that no dangerous reaction can occur between the lubricant and the pumped medium.



Have all required parts prepared so that assembly can be completed quickly. The lubricants are only effective for a short time. After that, the axial mobility and thus the automatic adjustment of the elastomers are lost.



Never push elastomers over sharp edges. If necessary, use mounting devices.



During installation, push the mech. seals with a bellows in such a way that the bellows is compressed and not stretched (danger of tearing apart!).

### 3.4 Bearing

The shaft is guided by the ball bearings of the motor. The bearings are grease lubricated for life and, therefore maintenance-free.

### 3.5 Approximate Value for Sound Pressure Level

Pump	Sound pressure level $L_{pA}$ in dB(A)		
	2900 rpm	1450 rpm	950 rpm
100-125 4 kW	65		
100-125 5,5 kW	74		
100-160 7,5 kW	74		
125-160 30 kW	78		
125-200 30 kW	78		
125-200 37 kW	80		
150-200 30 kW	78		
150-200 37 kW	80		
150-200 45 kW	80		
150-250 55 kW	82		
200-200 11 kW		68	
200-250 15 kW		69	
200-250 18,5 kW		70	
200-250 22 kW		71	
200-270 30 kW		72	
200-315 37 kW		72	
250-315 37 kW		74	
250-315 45 kW		78	
250-315 55 kW		82	
250-350 75 kW		82	
250-400 90 kW		82	
300-350 110 kW		83	
300-400 110 kW		83	
300-450 132 kW		83	
300-480 160 kW		84	
200-200 5,5 kW			64
200-250 5,5 kW			64
200-270 7,5 kW			68
200-315 11 kW			68
250-315 11 kW			65
250-315 15 kW			66
250-350 18,5 kW			68
250-350 22 kW			68
250-400 30 kW			68

The specified values for the sound pressure level  $L_{pA}$  are valid for pump and motor.

Sound pressure level  $L_{pA}$  measured in 1 m distance from pump surface acc. to DIN 45635, part 1 and 24. Room and foundation influences are not considered.

The tolerance for these values is  $\pm 3$  dB(A).

Addition with 60 Hz-operation:

Pump alone: -

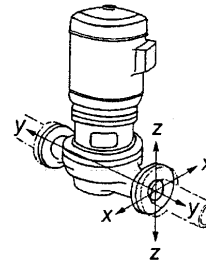
Pump with motor: +4 dB(A)

### 3.6 Permitted Nozzle Loads and Torques at the Pump Nozzles ...

... following the Europump-Recommendation for pump acc. to ISO 5199.

The data for forces and torques are only valid for static piping loads and are valid for one nozzle.

All values for forces and torques refer to standard material 0.6020.



Valid for the pump hanging in the piping

Size	Pump Nozzles								
	ØDN	Forces [N]				Torques [Nm]			
		F <sub>x</sub>	F <sub>y</sub>	F <sub>z</sub>	ΣF	M <sub>x</sub>	M <sub>y</sub>	M <sub>z</sub>	ΣM
100-125	100	1500	1675	1350	2625	875	625	725	1300
100-160	100	1500	1675	1350	2625	875	625	725	1300
125-160	125	1775	1975	1600	3100	1050	750	950	1525
125-200	125	1775	1975	1600	3100	1050	750	950	1525
150-200	150	2250	2500	2025	3925	1250	875	1025	1825
150-250	150	2250	2500	2025	3925	1250	875	1025	1825
200-200	200	3000	3350	2700	5225	1625	1150	1325	2400
200-250	200	3000	3350	2700	5225	1625	1150	1325	2400
200-270	200	3000	3350	2700	5225	1625	1150	1325	2400
200-315	200	3000	3350	2700	5225	1625	1150	1325	2400
250-315	250	3725	4175	3375	6525	2225	1575	1825	3275
250-350	250	3725	4175	3375	6525	2225	1575	1825	3275
250-400	250	3725	4175	3375	6525	2225	1575	1825	3275
300-350	300	4475	5000	4025	7825	3025	2150	2475	4450
300-400	300	4475	5000	4025	7825	3025	2150	2475	4450
300-450	300	4475	5000	4025	7825	3025	2150	2475	4450
300-480	300	4475	5000	4025	7825	3025	2150	2475	4450

Valid for the pump standing on the support foot

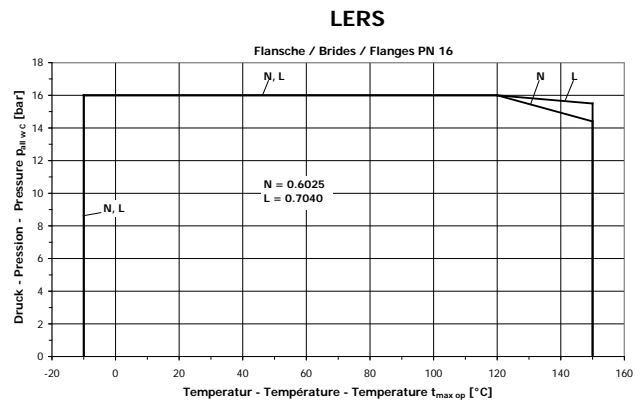
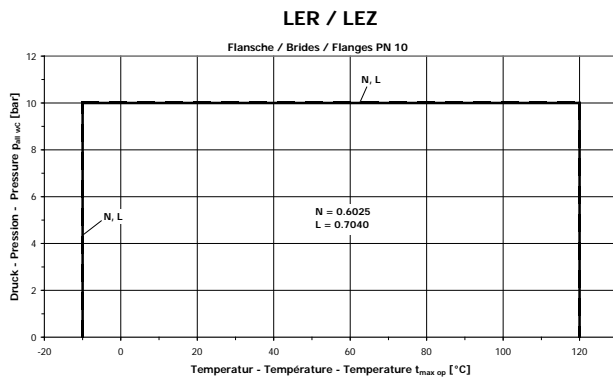
Size	Pump Nozzles								
	ØDN	Forces [N]				Torques [Nm]			
		F <sub>x</sub>	F <sub>y</sub>	F <sub>z</sub>	ΣF	M <sub>x</sub>	M <sub>y</sub>	M <sub>z</sub>	ΣM
100-125	100	1125	1260	1020	1970	625	375	475	870
100-160	100	1125	1260	1020	1970	625	375	475	870
125-160	125	1330	1480	1200	2325	800	500	700	1175
125-200	125	1330	1480	1200	2325	800	500	700	1175
150-200	150	1690	1875	1520	2950	1000	625	775	1410
150-250	150	1690	1875	1520	2950	1000	625	775	1410
200-200	200	2250	2520	2025	3920	1375	900	1075	1970
200-250	200	2250	2520	2025	3920	1375	900	1075	1970
200-270	200	2250	2520	2025	3920	1375	900	1075	1970
200-315	200	2250	2520	2025	3920	1375	900	1075	1970
250-315	250	2800	3130	2530	4900	1975	1325	1575	2860
250-350	250	2800	3130	2530	4900	1975	1325	1575	2860
250-400	250	2800	3130	2530	4900	1975	1325	1575	2860
300-350	300	3360	3750	3020	5870	2775	1900	2225	4040
300-400	300	3360	3750	3020	5870	2775	1900	2225	4040
300-450	300	3360	3750	3020	5870	2775	1900	2225	4040
300-480	300	3360	3750	3020	5870	2775	1900	2225	4040

### 3.7 Permitted pressures and temperatures

Basically the values, regarding pressures and temperatures, given in the data sheet and / or the order confirmation, as well as on the name plate are valid. Exceeding or remaining under of these values are undue. If there are no pressures and / or temperatures mentioned in data sheet and / or order confirmation, the following limits are valid for suction pressure and room temperature:

**Suction pressure (System pressure) = Pressure at pump suction: max. 5 bar**  
**Ambient temperature max. 40°C.**


On application of pumps local laws and regulations must be noticed, as well (e.g. DIN 4747 or DIN 4752, section 4.5).




## 4. Transport, Handling, Storage


### 4.1 Transport, Handling


- Check the pump / pump unit immediately upon delivery / receipt of despatch for damage or missing parts.
- The pump / pump unit must be transported carefully and by competent personnel. Avoid serious impacts.
- Keep the pump / pump unit in the same position in which it was supplied from the factory. Take note of the instructions on the packaging.
- The suction and discharge side of the pump must be closed with plugs during transport and storage.

 Dispose of all packing materials in accordance with local regulations.

- Lifting devices (e.g. fork-lift truck, crane, crane device, pulleys, sling ropes, etc.) must be sufficiently strong and must only be used by authorized persons.
- The pump / pump unit may only be lifted by solid points such as the casing, flanges or frame. Picture 2 shows the correct method of carrying by crane.

 Do not stand underneath suspended loads. Take note of the general regulations on prevention of accidents. The pump / pump unit must be secured against tipping over and slipping until it has been fixed in its final location.

 Sling ropes must not be fixed to ends of shafts or the ring loops of the motor.

 Slipping out of the pump / unit of the transport lifting device can cause damages to persons and things.

### 4.2 Storage / Conservation


Pumps or units, which are stored over a longer period before start-up (max. 6 months), must be protected from moisture, vibrations and dirt (e.g. by wrapping in oil paper or plastic). Pumps must basically be stored in a place where they are protected from the weather, e.g. under dry cover. During this time, all suction and discharge branches and all other intakes and outlets must be closed with dummy flanges or plugs. For longer periods of storage conservation measurements at machined surfaces and packing with moisture protection can be necessary!

## 5. Mounting / Installation

### 5.1 Mounting of Pump / Unit

Smaller pump units up to 15 kW motor power can get installed directly into the piping, for bigger pumps must be used a support foot. Pumps with support foot must be screwed tight to a stiff base (e.g. concrete basement, steel plate, steel girder, aso.). The base must withstand all loads occurring during operation.

The size of the base resp. the position and the size of the recess for the anchor bolts refer to the dimensional drawing.

 Sufficient space must be provided for maintenance and repair work, especially for replacing the drive motor or the complete pump unit. The motor fan must be able to take in enough cool air, and the intake grille must therefore be at least 10 cm away from any wall, etc.

- Set the pump unit on the base and adjust the nozzles with a spirit level. Anchor bolts must be cast with the foundation.

- If vibrations are transmitted to the pump foundation from adjoining components, it must be guarded through adequate vibration damping paddings (vibrations from outside can impair the bearing).



The size of these insulating pads will vary, depending on circumstances, and should therefore be determined by an experienced specialist.

Heavy pumps should be mounted on a concrete foundation, which is isolated against the ground with a min. 20 cm thick rubber- or cork plate.

## 5.2 Connection of Piping to the Pump



The pump must not be used as fixed point for the piping. The permitted piping loads must not be exceeded, refer to chapter 3.6.

### 5.2.1 Suction and discharge pipe

- The pipes must be of a size and design that liquid can flow freely into the pump and that the pump functions without problems. Particular attention is to be paid to ensuring that suction pipes are airtight and that the NPSH values are observed. Under suction lift condition lays the suction pipe in the horizontal section towards the pump so that it is slightly inclined upwards so that no air traps occur. Do not install fittings or elbows right before the suction nozzle.
- Piping for direct installation must show adequate firmness. Keep in mind vibration insulation (see chapter 5.1).
- When laying the pipes, make sure that the pump is accessible for maintenance, installation and disassembly.
- Notice "Permitted Forces on Flanges" (chapter 3.6).
- Before connecting up to pump: remove protective coverings from suction and discharge branches.
- Before starting up, the pipe system, fittings and equipment must be cleaned to remove weld spatter, scale etc. Any pollutants are to be completely removed from pump units that are directly or indirectly connected to drinking water systems before being installed and taken into use.
- To protect the shaft sealing (especially mechanical seals) against foreign impurities, it is recommended that a sieve, 800 micron, is

installed in the suction / intake pipe when the motor is being started up.

- If the pipe system is tested with the pump installed, do not exceed the maximum permitted casing pressure of the pump and/or shaft sealing (see data sheet).
- When emptying the pipe after the pressure test, make sure that the pump is treated properly (danger of rust and problems when starting up).

## 5.3 Electric Connection



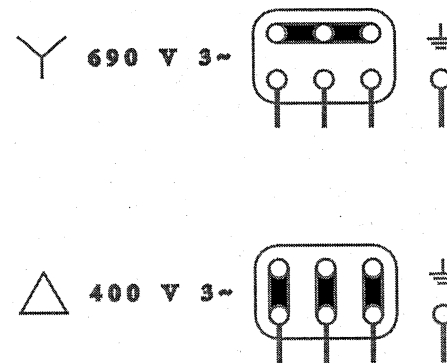
Electrical connection work may only be carried out by an authorised professional. The rules and regulations valid for electrical technology, especially those concerned with safety measures, must be observed. The regulations of the national power supply companies operating in that area must also be observed.

Before starting work, check that the information on the motor name plate is the same as the local mains network. The power supply cable of the coupled drive motor must be connected up in accordance with the wiring diagram produced by the motor manufacturer. A protective motor switch must be provided.



In areas endangered to explosion IEC 60079-14 must additionally be noticed for the electric installation.

### Standard connection:



## 5.4 Final check

It must be possible to turn the unit easily by hand at the stub shaft.

## 6. Start-up, Operation, Shut down



The plant may only be started up by people who are familiar with the local safety regulations and with these Operating Instructions (especially with the safety regulations and safety instructions given here).

### 6.1 Initial start-up

Before starting up the pump, check, if the following points were controlled and carried out:

- There is no need to lubricate the pump before starting it up.
- Pump and suction pipe must be filled completely with liquid when starting up.
- At vertical installation position the seal chamber must get vented before initial start-up.

- Turn pump unit once again by hand and check that it moves smoothly and evenly.
- Open valve in suction /intake pipe.
- Set discharge side valve to approx. 25% of rated flow quantity. With pumps with a discharge branch rated width less than 200, the valve can remain closed when starting up.
- Secure, that unit is electrically connected acc. to all regulations and with all safety devices.
- Check direction of rotation by switching on and off briefly. It must be the same as the directional arrow on the drive lantern.

## 6.2 Switch on drive

- Immediately (max. 30 seconds on 50 Hz resp. max. 20 seconds on 60 Hz currency feed) after reaching normal operating speed open discharge valve and adjust the required operating point. The pumping data shown at the type plate resp. in the data sheet and / or the order confirmation must be met. Every change is only permitted after talking with the manufacturer!



Operation with closed valve in the suction and / or discharge piping is not permitted.



On starting-up without back-pressure, the back-pressure must be produced through throttling at the discharge side. After reaching full back-pressure open valve.



If pump does not reach attended head or if atypical sounds or vibrations do occur: Switch off pump (see chapter 6.7) and seek for causes (see chapter 10).

## 6.3 Restarting

Basically, the same procedure should be followed as for starting up for the first time. However, there is no need to check the direction of rotation and the accessibility of the pump unit.

The pump should only be automatically restarted if it has been made sure that the pump has remained filled whilst stand by.



Be particularly careful not to touch hot machine parts and when working in the unprotected shaft seal area. Remember that automatically controlled systems may switch themselves on suddenly at any time. Suitable warning signs should be affixed.

## 6.4 Limits of Operation



The operating limits of the pump / unit regarding pressure, temperature, performance and speed are shown in the data sheet and / or order confirmation and must be observed under any circumstances!

- Do not exceed the output given on the motor name plate.
- Avoid sudden changes in temperature (temperature shocks).

- The pump and motor should run evenly and without vibrations; check at least once a week.

### 6.4.1 Flow min. / max.

If no other data are given in the curves or data sheets, the following is valid:

$$Q_{\min} = 0,1 \times Q_{\text{BEP}} \text{ for for short time operation}$$

$$Q_{\min} = 0,3 \times Q_{\text{BEP}} \text{ for continuous operation}$$

$$Q_{\max} = 1,2 \times Q_{\text{BEP}} \text{ for continuous operation *)}$$

$Q_{\text{BEP}}$  = Flow in efficiency optimum

\*) on condition that  $\text{NPSH}_{\text{facility}} > (\text{NPSH}_{\text{pump}} + 0,5 \text{ m})$

### 6.4.2 Abrasive Media



On pumping liquids with abrasive components an increased wear at hydraulic and shaft sealing must be expected. The intervals of inspection should be reduced compared to the usual times.

### 6.4.3 Permitted number of starts

The permitted number of starts of the pump must not be exceeded, see diagram 6.

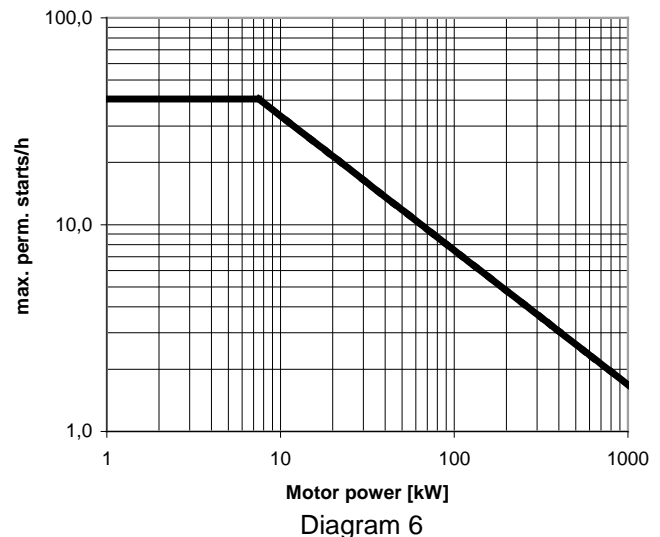


Diagram 6

With electric motors, the permitted number of starts is given in the attached motor operating instructions. If two different figures are given, the lower figure is valid.

## 6.5 Lubrication

The bearings are grease lubricated for lifetime and therefore maintenance-free.

## 6.6 Monitoring



Regular monitoring and maintenance will extend the life of your pump or pump system.

- Pumps which are exposed to corrosive chemicals or to wear through abrasion must be inspected periodically for corrosion or wear and tear. The first inspection should be carried out after six

months. All further inspection intervals should be determined on the basis of the state of the pump.

## 6.7 Shutting down

- Close the valve in discharge pipe right before (max. 10 seconds) switching off the motor. This is not necessary if there is a spring-loaded check valve.
- Switch off motor (make sure it runs down quietly).
- Close the valve on suction side.
- On danger of freezing empty pump and pipes completely.

## 6.8 Storage / longer periods of non-operation

### 6.8.1 Storage of new pumps

If the putting into operation shall happen a longer period after the delivery, we recommend the following measures for the storage of the pump:

- Store pump at a dry place.
- Rotate pump by hand at least once a month.

### 6.8.2 Measures for longer putting out of operation

Pump remains installed and in ready for operation:

- Test runs of 5 min. duration must be made in regular intervals. The span between the test runs is depending on the plant. However, it should be made once a week, at least.

### 6.8.3 Longer periods of non-operation

Start-up must be handled like initial start-up (see chapter 6).

#### a) Filled pumps

- Switch stand-by pumps on and immediately off again once a week. Possibly use as main pump.
- If the stand-by pump is under pressure and temperature: leave all existing sealing and flushing systems switched on.
- Replace motor bearings after 5 years.

#### b) Drained pumps

- Turn shaft at least 1x week (do not switch on because of dry running).
- Replace motor bearings after 5 years.

## 7. Servicing, Maintenance

### 7.1 General remarks



Work should only be carried out on the pump or pump unit when it is not in operation. You must observe chapter 2.



Maintenance and servicing work must only be carried out by trained, experienced staff who are familiar with the contents of these Operating Instructions, or by the Manufacturer's own service staff.

### 7.2 Mechanical seals



Before opening the pump, it is essential that you note chapter 2 and chapter 8.

If the liquid being handled leaks out at the mechanical seal, it is damaged and must be replaced.

### 7.3 Motor bearings

After approx. 5 years the grease in the motor bearings is so aged, that a replacement of the bearings is recommended. However, the bearings must be replaced after 25000 operating hours, at least, resp. acc. to the Maintenance Instruction of the motor supplier, if that recommends a shorter maintenance period.

### 7.4 Cleaning of pump

- Dirt on the outside of the pump has an adverse effect on transmission of heat. The pump should therefore be cleaned with water at regular intervals (depending on the degree of dirt).



The pump must not be cleaned with pressurized water - water will get into the motor.

## 8. Dismantling and repair of pump

### 8.1 General remarks



Repair to the pump or pump system may only be carried out by authorised skilled personnel or by the manufacturer's specialist staff.



When disassembling the pump pay attention to chapter 2 and chapter 4.1.


- For mounting and repair you can order specialized personnel if you want.





If dangerous liquids are pumped the appropriate disposal of the handled liquid is necessary before the disassembly of the pump. Pay attention to the fact, that even in drained pumps there are remainders of the handled liquid. If necessary the pump must be flushed or decontaminated. Laws must be observed, otherwise danger to health is existing!

- Before the disassembly the pump has to be secured in such a way, that it cannot be started.
- The pump casing must be drained and without pressure.

- All locking devices in the suction- and discharge-pipe must be closed.
- All parts must have taken on the temperature of the environment.

 Secure disassembled pumps, units or single parts against tipping over or rolling off.

 While disassembling the pump use of an open flame (blowlamp, etc.) only, when there is no danger of setting fire, cause an explosion or cause injurious vapours.

 Use original spare parts only. Pay attention to the right materials and the matching design.


**8.2 General**

Carry out disassembly and mounting according to the appropriate sectional drawing. You will only need common tools. Before disassembly check if required parts are ready. Disassemble the pump only so far, as required for the replacement of the repair part.

**9. Spare parts, Spare pumps**

**9.1 Spare parts**

Spare parts should be selected to last for two-year continuous operation. If no other guidelines are applicable, we recommend that you stock the number of parts listed below (in accordance with VDMA 24296).

 To ensure optimum availability, we recommend that suitable quantities of spare parts are held in stock, especially if these are made from special materials and in the case of mechanical seals, because of the longer delivery times.

Spare Parts	Number of pumps (incl. stand-by pumps)							
	2	3	4	5	6/7	8/9	10/+	
	Number of spare parts							
Casing gasket	2	3	4	5	6	8	100%	
Mech. seal	1	2	2	2	3	4	50%	
Complete drive unit	1	1	1	1	1	2	15%	


**Ordering spare parts**

When ordering spare parts, please supply the following information:


- Type: \_\_\_\_\_
- S/N (Order No.) \_\_\_\_\_


- Part name \_\_\_\_\_
- Sectional drawing \_\_\_\_\_

All the information is given in the data sheet and the relevant sectional drawing.

 Store spare parts in dry and clean rooms.

**9.2 Stand-by pumps**

 It is essential that a sufficient number of stand-by pumps are kept ready for use in plants where failure of a pump could endanger human life or cause damage to property or high costs. Regular checks should be carried out to ensure that such pumps are always ready for use (see Point 6.8).

 Store stand-by pumps according to point 6.8.

**10. Faults - Causes and Solutions**

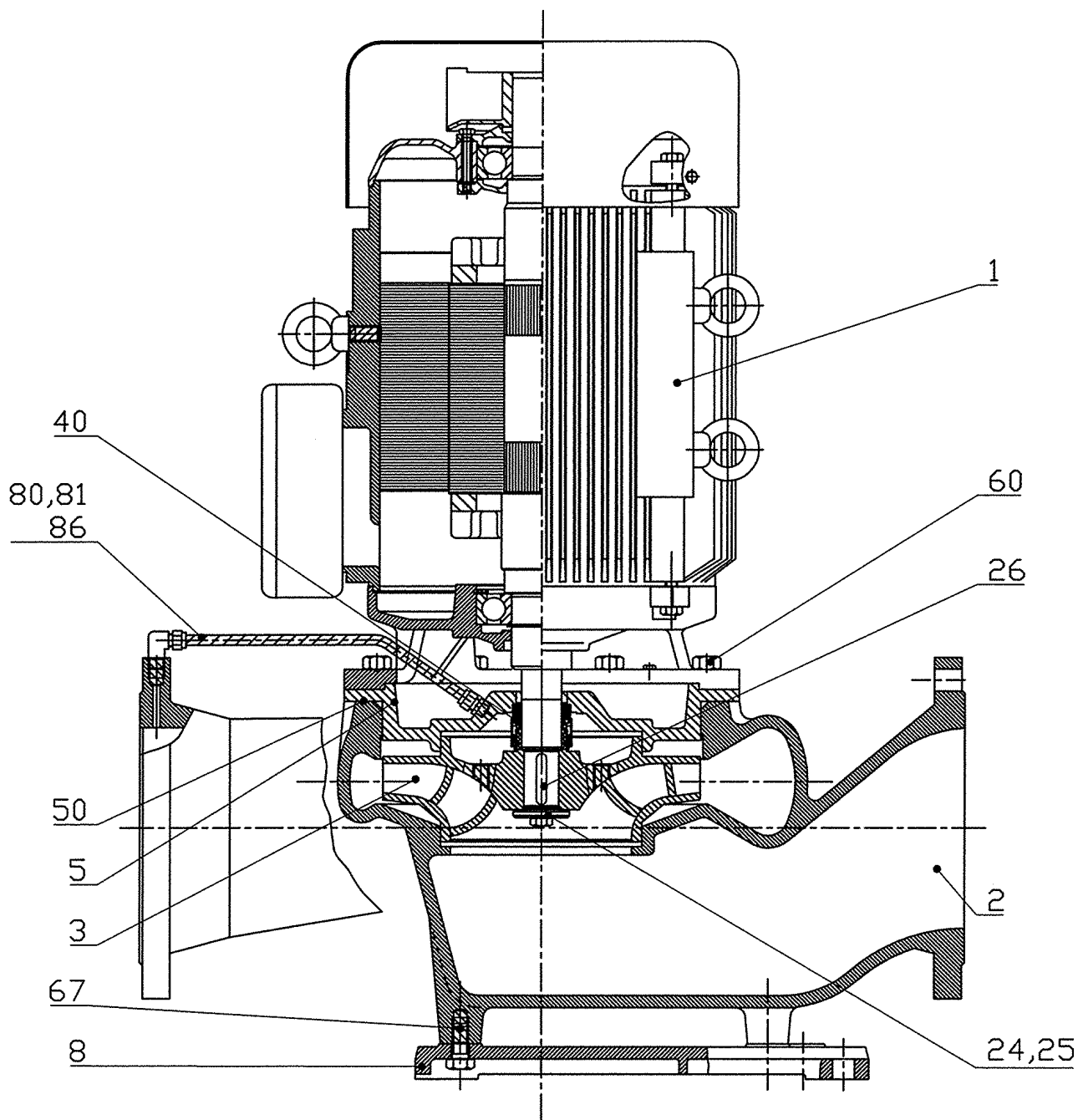
The following notes on causes of faults and how to repair them are intended as an aid to recognising the problem. The manufacturer's Customer Service Department is available to help repair faults that the operator cannot or does not want to repair. If the

operator repairs or changes the pump, the design data on the data sheet and chapter 2 of these Operating Instructions should be particularly taken into account. If necessary, the written agreement of the manufacturer must be obtained.

Discharge too low	Discharge stops after a time	Head too low	Head too high	Drive mechanism overloaded	Pump not running quietly	Temperature in pump too high	Temperature in shaft sealing too high	Temperature at the bearing too high	Pump leaking	Leakage rate at shaft sealing too high	Cause	Solution
■											Back-pressure too high	check facility for pollution, open discharge valve reduce resistance in discharge pipe (e.g. clean filter if necessary) use larger impeller (note available motor power)
		■		■				■			Back-pressure too low, discharge too low	throttle discharge valve
			■	■							Speed too high	reduce speed compare speed of motor with specified pump speed (rating plate) when adjusting speed (frequency transformer) check reference value setting
■	■										Speed too low	increase speed (check available motor power) compare speed of motor with specified pump speed (rating plate) when adjusting speed (frequency transformer) check reference value settings
	■	■		■	■						Flow too little	increase min. flow (open discharge valve, bypass)
								■			Flow too big	reduce flow (throttle discharge valve)
			■	■							Impeller diameter too big	use smaller impeller
■	■	■									Impeller diameter too small	use larger impeller (check available motor power)
■	■	■		■	■						Pump and/or pipes not completely filled with liquid	fill vent
■	■	■									Pump or suction/intake pipe blocked	clean
■	■	■									Air pocket in pipeline	vent improve course of pipe
■	■	■		■	■						Suction height too big / NPSH of system too small	increase liquid level and admission pressure reduce resistance in the intake/suction pipe (change course and rated width, open shut-off valves, clean filters)
■	■	■									Air being sucked in	increase liquid level check if suction pipe is vacuum-tight
■	■	■									Air being sucked in through shaft sealing	clean sealing pipe increase sealing pressure replace shaft sealing
■	■	■									Direction of rotation is wrong	swap over two phases of power supply (to be done by an electrician)
■	■	■		■				■			Inner components suffering from wear	replace worn parts
■	■	■		■							Density and/or viscosity of liquid handled is too high	seek assistance
								■		■	Lines and roughness at shaft	replace parts
										■	Deposits on mechanical seal	clean replace mechanical seal if necessary if necessary provide additional rinsing or quench
				■						■	Impeller out of balance	remove blocks/deposits replace impeller if broken or unevenly worn check shafts to ensure that they are running true
				■	■			■	■	■	Forces in pipeline too high (pump unit under strain)	change (support pipes, use compensators, etc.) is foundation plate/frame properly cast in place?
				■							Electricity supply not right (2-phase running)	check voltage of all phases check cable connections and fuses
									■		Sealing insufficient	tighten screws replace sealing
				■					■		Bearing damaged	replace
									■		Relief fittings insufficient	clean relief openings in impeller replace worn parts (impeller, split rings) adjust in line with the system pressure/intake pressure given on ordering
				■							System-related vibrations (resonance)	seek assistance



Sectional drawing LER, LERS

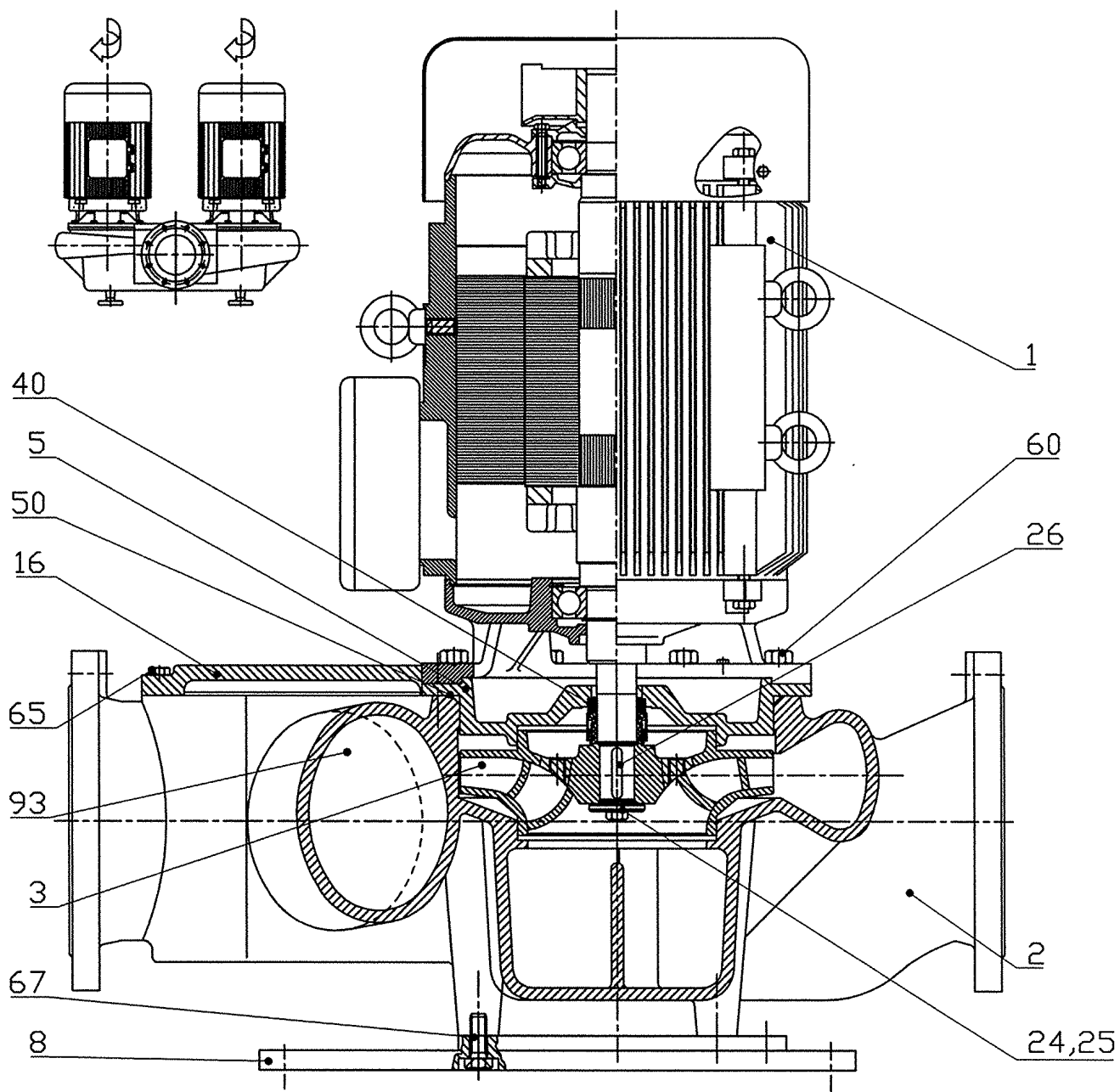


Index of parts  
 Motor  
 Pump casing  
 Impeller  
 Casing cover  
 Support foot  
 Hexagonal screw  
 Washer  
 Impeller key  
 Mechanical seal  
 O-ring  
 Hexagonal screw  
 Hexagonal screw  
 Pipe connection  
 Pipe connection  
 Cooling pipework system

No.  
 1  
 2  
 3  
 5  
 8  
 24  
 25  
 26  
 40  
 50  
 60  
 67  
 80  
 81  
 86

Subject to techn. alterations!  
 Not to scale!

Sectional drawing LEZ



Index of parts	No.
Motor	1
Pump casing	2
Impeller	3
Casing cover	5
Support foot	8
Cover	16
Hexagonal screw	24
Washer	25
Impeller key	26
Mechanical seal	40
O-ring	50
Hexagonal screw	60
Hexagonal screw	65
Hexagonal screw	67
Flap	93

Subject to techn. alterations!  
Not to scale!

**Weights:**

<b>LER, LERS - 2900 min<sup>-1</sup></b>		
Complete unit	Motor power [kW]	Weight [kg]
LER(S) 100-125 UN. 402	4,0	75
LER(S) 100-125 UN. 552	5,5	99
LER(S) 100-160 UN. 752	7,5	109
LER(S) 125-160 UNL 3002	30,0	350
LER(S) 125-200 UNL 3002	30,0	350
LER(S) 125-200 UNL 3702	37,0	370
LER(S) 150-200 UNL 3002	30,0	375
LER(S) 150-200 UNL 3702	37,0	395
LER(S) 150-200 UNL 4502	45,0	435
LER(S) 150-250 UNL 5502	55,0	465

<b>LER, LERS - 1450 min<sup>-1</sup></b>		
Complete unit	Motor power [kW]	Weight [kg]
LER(S) 200-200 UNL 1104	11,0	315
LER(S) 200-250 UNL 1504	15,0	330
LER(S) 200-250 UNL 1854	18,5	365
LER(S) 200-250 UNL 2204	22,0	380
LER(S) 200-270 UNL 3004	30,0	460
LER(S) 200-315 UNL 3704	37,0	500
LER(S) 250-315 UNL 3704	37,0	610
LER(S) 250-315 UNL 4504	45,0	650
LER(S) 250-315 UNL 5504	55,0	730
LER(S) 250-350 UNL 7504	75,0	870
LER(S) 250-400 UNL 9004	90,0	950
LER(S) 300-350 ULL 11004	110,0	1250
LER(S) 300-400 ULL 11004	110,0	1250
LER(S) 300-450 ULL 13204	132,0	1350
LER(S) 300-480 ULL 16004	160,0	1500

<b>LER, LERS - 970 min<sup>-1</sup></b>		
Complete unit	Motor power [kW]	Weight [kg]
LER(S) 200-200 UNL 556	5,5	295
LER(S) 200-250 UNL 556	5,5	295
LER(S) 200-270 UNL 756	7,5	295
LER(S) 200-315 UNL 1106	11,0	295
LER(S) 250-315 UNL 1106	11,0	385
LER(S) 250-315 UNL 1506	15,0	430
LER(S) 250-350 UNL 1856	18,5	505
LER(S) 250-350 UNL 2206	22,0	515
LER(S) 250-400 UNL 3006	30,0	580

<b>LEZ - 2900 min<sup>-1</sup></b>		
Complete unit	Motor power [kW]	Weight [kg]
LEZ 100-125 UNN 402	4,0	138
LEZ 100-125 UNN 552	5,5	186
LEZ 100-160 UNN 752	7,5	202
LEZ 125-160 UNL 3002	30,0	705
LEZ 125-200 UNL 3002	30,0	705
LEZ 125-200 UNL 3702	37,0	745

<b>LEZ - 1450 min<sup>-1</sup></b>		
Complete unit	Motor power [kW]	Weight [kg]
LEZ 200-200 UNL 1104	11,0	620
LEZ 200-250 UNL 1504	15,0	650
LEZ 200-250 UNL 1854	18,5	720
LEZ 200-250 UNL 2204	22,0	750
LEZ 200-270 UNL 3004	30,0	910
LEZ 200-315 UNL 3704	37,0	990
LEZ 250-315 UNL 3704	37,0	1170
LEZ 250-315 UNL 4504	45,0	1250
LEZ 250-315 UNL 5504	55,0	1410
LEZ 250-350 UNL 7504	75,0	1690
LEZ 250-400 UNL 9004	90,0	1850

<b>LEZ - 970 min<sup>-1</sup></b>		
Complete unit	Motor power [kW]	Weight [kg]
LEZ 200 200 UNL 556	5,5	580
LEZ 200 250 UNL 556	5,5	580
LEZ 200 270 UNL 756	7,5	580
LEZ 200 315 UNL 1106	11,0	580
LEZ 250 315 UNL 1106	11,0	720
LEZ 250 315 UNL 1506	15,0	810
LEZ 250 350 UNL 1856	18,5	960
LEZ 250 350 UNL 2206	22,0	980
LEZ 250 400 UNL 3006	30,0	1110