User manual
SP-LR pumps

Pomac Pumps

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This user manual has been released d.d.:.....
and belongs to:

SP-LR								

Pump serial number		
capacity		m^3/h
pressure		bar
NPSHR		m
Drive, make		
type		
speed		min^{-1}
voltage △ / ⅄	/	V
frequency		Hz
current		A
power		kW
isolation class		
protection class	IP	
area classification		
Coupling, make		
type		
size		

User manual Pomac SP-LR pumps

This manual has been compiled with the utmost care.
However, POMAC assumes no liability for possible deficiencies of the information in this manual. It is the responsibility of the buyer/user of this pump to ensure this information is complete and up-to-date.

Release date: June 2013

Doc. ID. : **CE/SP-LR (1306) EN-01**

DECLARATION OF INCORPORATION

(according to Annex II 1 B of the Machinery Directive (2006/42/EC – 1st Edition – December 2009)

Pomac bv
Feithspark 13
9356 BX Tolbert
The Netherlands

hereby declares completely under own responsibility that the pumps mentioned below:

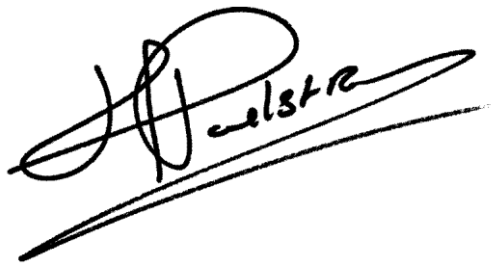
Manufacturer: **Pomac**
Type: **SP-LR**
Execution: KAM, KAV, IGH
Materials: 1.4404 (AISI 316L)

to which this declaration refers to, are in conformity with the following standards:

Standards: EN-ISO 12100 parts 1 & 2
NEN-EN 60204 part 1
EN 809

The pump must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of this Directive (2006/42/EC), where appropriate.

Issued at Tolbert, 25th of June 2013



H. Poelstra
Managing Director

Table of contents

1. Introduction

1.1. General information

This manual provides important information regarding the correct way of installing, operating and servicing this pump.

This manual also provides information necessary to prevent the installer/operator from injury or discomfort during installation and operation of this pump and to ensure the correct use and reliable performance of this pump.

This manual represents the most recent information regarding the pump types mentioned in this manual at the time of going to print. However, POMAC reserves the right to modify the construction of the pump types mentioned, as well as the contents of this manual, without prior or afterward notification.

Read this manual thoroughly before installing, operating or servicing this pump. Ensure that operators and maintenance staff are familiar with the symbols used. Follow the instructions in this manual step by step.

1.2. Warranty

Warranty is strictly limited to the conditions specified by POMAC and will only be granted according to these conditions.
Warranty will only come into force provided that:

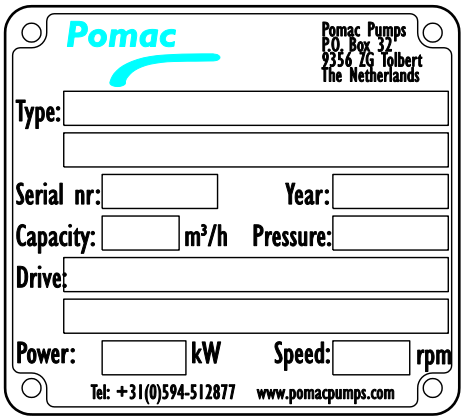
- the pump has been installed and put into operation strictly in accordance with the instructions given in this manual.
- maintenance and repairs have been carried out according to the instructions given in this manual.
- exclusively original POMAC parts or parts provided by POMAC have been used for replacing parts.
- the pump has not been used for applications other than those shown in the specifications according to which the pump was sold.
- no changes have been made to the construction of the pump itself by the buyer.
- the damage is not the result of work carried out by persons not qualified or appointed.
- the damage has not been caused through major force.

1.3. Transport and receipt

1. Check to see if the pump has not been subject to damage during transportation. If this is the case, report it directly to the carrier and to POMAC;
2. If the pump is delivered on a pallet, leave it on the pallet for as long as possible. This facilitates internal transport.
3. If a suitable hoisting device is available, use this if the pump is fitted with lifting eyes.
4. With the exception of the motors fitted with a stainless steel shroud, the motors (pumps) from construction size 112 or 132 can be fitted with a screw-in lifting eye.

Motor size	100-112	132	160	180	200
Lifting eye thread size	M8	M10	M10	M12	M16

1.4. Pump identification



- On the type plate of the pump the serial number and the type code are indicated. The type code describes the arrangement of the pump.
- Always refer to the serial number and the type code in any correspondence and when ordering parts.

☛ *These pump data are also stated on the first page of this manual.*
If the pump type plate is missing, please provide us with the following details of the impeller so we can establish the correct pump size:

Impeller

Diameter D	
Diameter d	
Blade width H	

Motor

There is a motor type plate on the motor itself.

1.5. Type code

The type code consists of the following items:

x	x	x	-	x	-	x	-	x	-	x	-	x	-	x
1	2	3		4		5		6		7		8		9

Example: **SP-RL 23255 – KAM – 4 – 11 – S1**

1. Type

SP-RL

2. Pump size

186 / 232

3**. Connection sizes**

44 / 55

4. Construction

KAM / KAV / IGH

5. Electric motor poles

4

6. Power

2.2	=	0220
3	=	0300
4	=	0400
7.5	=	0750
11	=	1100

7. Mechanical seal

S1 = mechanical seal, unbalanced, internal
S2 = mechanical seal, unbalanced, external
B1 = mechanical seal, balanced, internal

8. Connections

A = DIN 11851
B = SMS 1145
C = Tri Clamp
D = DIN 11864-1
E = Flanges DIN 2633
F = special connection
G = inch
H = metric

9. Options

V = heating jacket
I = drain
T = turbine
X = ATEX
P = PTC probe in electric motor
S = extra surface roughness treatment internal parts
W = internal parts hardened

1.6. Ordering spare parts

An order form for ordering spare part is included in the documents accompanying this pump. You should state the following details on this form:

- your address data
- the **serial number and the type number** (these are stated on the type plate of the pump and on the first page of this manual).
- the **item numbers** and **quantities** of the desired parts.

☛ *See chapter 8 for the sectional drawings of the pump, with the corresponding parts lists with item numbers.*

1.7. Manufacturer

SP-RL pumps are manufactured by

Pomac bv
Feithspark 13
9356 BX Tolbert
The Netherlands
Tel +31(0) 594 5128 77
Fax +31(0) 594 5170 02
info@pomacpumps.com
www.pomacpumps.com

2. Safety

2.1. General information

This manual provides information necessary to prevent the installer/operator from injury or discomfort during installation and operation of this pump and to ensure the correct use and reliable performance of this pump.

- Read this manual thoroughly before installing, operating or servicing this pump.
- Ensure that operators and maintenance staff are familiar with the contents of this manual and with the instructions given.
- Ensure that operators and maintenance staff are familiar with the symbols used.
- Follow the instructions in this manual step by step.
- Store this manual in a place that is known and accessible to any user.

2.2. Instructions

This manual contains instructions with regard to the safety of the user, the continued good functioning of the pump and hints to facilitate certain actions or procedures.
These instructions are indicated with the following symbols:

Warning! May cause injury to the user! Act strictly in accordance with the instructions given!

! **Caution! May cause severe damage to the pump or bad functioning! Closely follow the instructions given!**

Note: Hint or instruction that can facilitate certain actions.

Issues which require extra attention are printed in **bold**.

2.3. Staff

All personnel, in charge of the installation, operation or maintenance and overhaul of the pump, should have received the necessary training.

2.4. Precautions

 ***When performing maintenance work to the pump ensure that the drive of the pump is shut down and can not be switched on unintentionally!***

 ***All work on and with the pump must always be in accordance with all the prevailing standards regarding occupational health and safety as well as machine safety!***

 ***Always wear protective gloves and safety goggles if the pump conveys harmful liquids that may cause injuries!***

 ***See to is that the pump is depressurized, when it has to be disassembled for overhaul!***

 ***Allow the pump to cool down first when it is used for conveying hot liquids!***

2.5. Changed application

- Contact POMAC in case the pump is going to be used for other applications or in different circumstances than those specified during the initial pump selection.

3. Description

3.1. SP-RL self-priming water ring pump

3.1.1. Pump description

This self-priming pump works according to the water ring principle and is therefore able to pump liquid/air mixtures.

3.1.2. Application area

The application area goes from a capacity of 60 m^3/h to a manometric head of 5 bars.

3.2. Connections

All pump types are available with the following connections:

- Screw coupling according to DIN 11851
- SMS 1145
- Tri-clamp
- DIN 11864-1
- DIN 11864-2
- Flanges DIN 2633
- BSP
- NPT
- Connections according to client specification

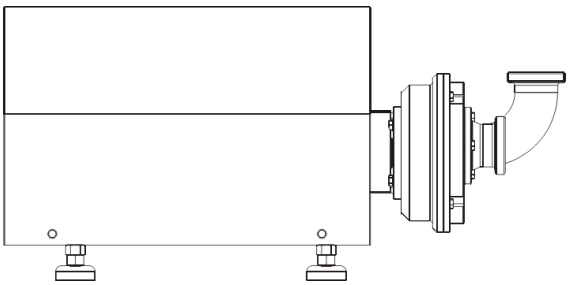
3.3. Materials

- All parts that come into contact with the liquid are designed in stainless steel 304 or 316L (Werkstoffnr. 1.4301 and 1.4404 respectively).
- All pumps are suitable for being C.I.P. cleaned.

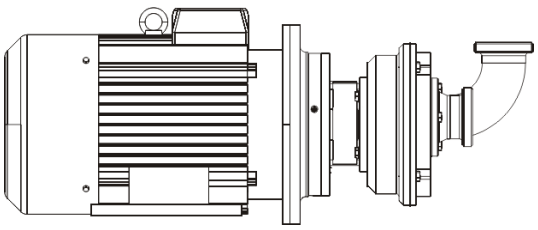
3.4. Construction designs

All pumps are available in the following, fully exchangeable designs:

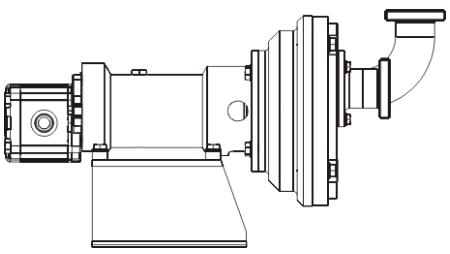
KAM
Pump and motor close coupled and placed on adjustable stainless steel feet. The motor is provided with a stainless steel shroud.



KAV
Pump and motor close coupled and placed on the motor feet.



IGH
Pump fitted to a bearing bracket, specially designed for hydraulic drives.



3.5. Shaft seals

3.5.1. Materials

The mechanical seals are standard according to EN 12756 (DIN 24960), with the exception of the build-in length.

The mechanical seals are available in the following materials:
- Carbon on silicon carbide
- Carbon on CrMo-steel
- Carbon on Ceramic
- Hard metal on hard metal
- Silicon carbide on silicon carbide
- Tungsten carbide on tungsten carbide
- Carbon on hard metal

The O-rings are available in:
- FPM (Viton)
- NBR
- EPDM
- PTFE

☛ *Pomac pumps are supplied as standard with an interior unbalanced mechanical seal (carbon on silicon carbide with EPDM O-rings).*

3.5.2. Type indication code

Code	Description
S1	interior single mechanical seal - unbalanced
S2	exterior single mechanical seal - unbalanced
B1	interior single mechanical seal - balanced

3.6. Drive

- The **KAM** and **KAV** design are fitted with B3/B5 foot/flange motor acc. to IEC provided with a balanced stainless steel extension shaft.
- The electric motors are available in all possible voltages, insulation categories, protection categories and in low-noise and in ATEX design.
- The **IGH** design is fitted with a special bracket and a hydraulic motor.

4. Installation

4.1. General

- The foundation must be smooth and level.
- For the KAM design set the adjustable legs using the leg adjustment feet (38), **in such a way that the pump is stable on all 4 legs!** Secure the leg adjustment feet with the lock nuts (39).
- Verify that the system pressure does not exceed the permitted operating pressure.
- Verify that the pipes do not show any leakage.
- The pipes must be installed and connected stress-free.
- Mount a filter between the pump and the suction line. The gap between the impeller and the pump casing is only 0.3 mm and particles can cause the pump to drag or seize.
- If backflow of the liquid flow is undesired, or there is a chance of undesired liquid mixing, apply a non-return valve in the suction line.

4.2. Connecting the electric motor

An electric motor may only be connected by a qualified electrician!

5. Putting into operation

5.1. Precautions

5.1.1. General

- Check that the shaft can turn freely. To do this, rotate the pump shaft a few times manually.
- Check that the fuses have been fitted.
- Type IGH is designed as standard with grease lubricated ball bearings that are provided with grease for their entire life (2RS1).

5.2. Checking the rotation direction

1. Fill the pump with the medium to be pumped.
2. Switch the pump on briefly.

Take care with any unprotected rotating parts!

3. Check that the rotation direction of the motor corresponds with the rotation direction of the pump (which is indicated by an arrow on the lantern piece). If the rotation direction is not correct, swap the connection wires L1 and L2.

This must be done by a qualified electrician!

4. Fit the guard.

5.3. Putting into operation

1. Fully open the shut-off-valves in the suction and pressure lines.
2. Switch the pump on and allow it to come up to pressure.
3. Set the pump to its required duty point.

5.4. In operation

5.4.1. Noise

The noise data stated in this manual refer to normal usage, with an electric motor. Under these conditions the noise level, measured at a distance of 1 meter and at a height of 1,6 meter, is below 85 dB(A). If after the passage of time the pump produces excessive noise, this can be an indication that there is a fault in the pump or elsewhere in the system (e.g. worn out bearings, cavitation).

5.4.2. Daily maintenance

- The valve in the suction pipe must always be completely open
- Regularly check that the inlet pressure is not too low to avoid the occurrence of cavitation in the pump
- Regularly check the delivery pressure
- Regularly check the shaft seals for leakage.

! **The pump may never run without liquid**

5.4.3. Cleaning procedure and agents

The pumps are suitable for being CIP cleaned.
Use the cleaning agents recommended for the products.

5.4.4. Periodic maintenance

SP-LR pumps basically are maintenance free. Only the following items require periodic attention:

- The electric motor bearings are greased for their entire life and do not require any maintenance or subsequent lubrication. This also applies to the bearings in the bearing bracket of the IGH build.
- A mechanical seal may not show any visible leakage. If this is the case, replace the shaft seal.
- If a mechanical seal does not show any visible leakage disassembly is not recommended!

5.5. Malfunction

If there is a malfunction in the pump, try to find the cause using the troubleshooting list at the back of this manual or consult your installer!

Always switch off the current first if you intend to investigate the malfunction yourself. Remove the fuse or lock the operating switch with a pad lock!

The pump can still be hot or under pressure. Allow the pump to cool down first and if possible release the pressure from the pump. Always wear the correct personal protection devices (goggles, gloves, etc.)!

6. Overhaul and repair

6.1. Removing the pump

First ensure the electric current has been switched off. Remove the fuses or switch the operating switch to OFF and lock it with a pad lock!

If the pumped liquid is HOT, first allow the pump to cool down!

1. Disconnect the electrical connections to the electric motor.
2. Loosen the connections of the pipes and remove the pump from the piping.

6.2. Dismantling and assembling the pump

The item numbers shown (...) refer to the illustrations and the parts lists in chapter 7

6.2.1. Dismantling the pump

1. Loosen the pump cover nuts (2) and remove the pump cover (12). Inspect the pump cover O-ring (14) for damage.
2. Remove the pump shaft nut (9) and the O-ring (10) and remove the impeller (16). Inspect the O-ring (17).
3. Remove the sunk key (11).
4. If necessary dismantle the shaft seal.
5. If necessary dismantle the stub shaft.

6.2.2. Assembling the pump

1. If it has been dismantled: fit the extension shaft (28). This has to be adjusted before the pump can be further assembled, see next paragraph.
2. If it has been dismantled: fit the shaft seal (19).
3. **For an interior seal check that the spring of the seal is positioned firmly against the collar of the shaft sleeve!**
4. Place the O-ring (17) in the impeller hub.
5. Put the sunk key (11) into the key way in the shaft and push the impeller onto the shaft. Ensure the O-ring (17) is installed properly.
6. Place the O-ring (10) and fit the pump shaft nut (9).

Use a feeler gauge to check that the gap between the impeller and the pump casing is 0.3 mm. If this is not the case, readjust the extension shaft!

7. Place the pump cover O-ring (14). Fit the pump cover (12) and tighten the pump cover nuts (2).

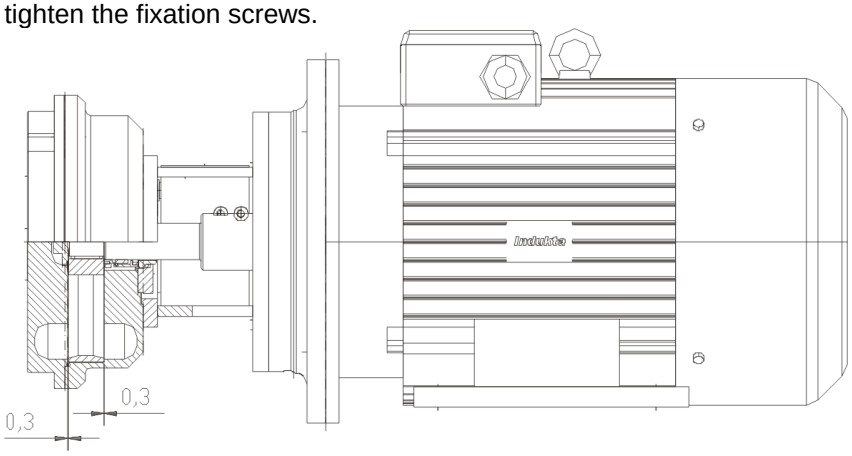
6.2.3. Application IEC standard motors with extension shaft

When replacing a standard IEC standard electric motor the new motor must always be equipped with axially fixed bearings at drive side, so the pump shaft with impeller cannot move in axial sense. It is recommended to apply clearance-free bearings.

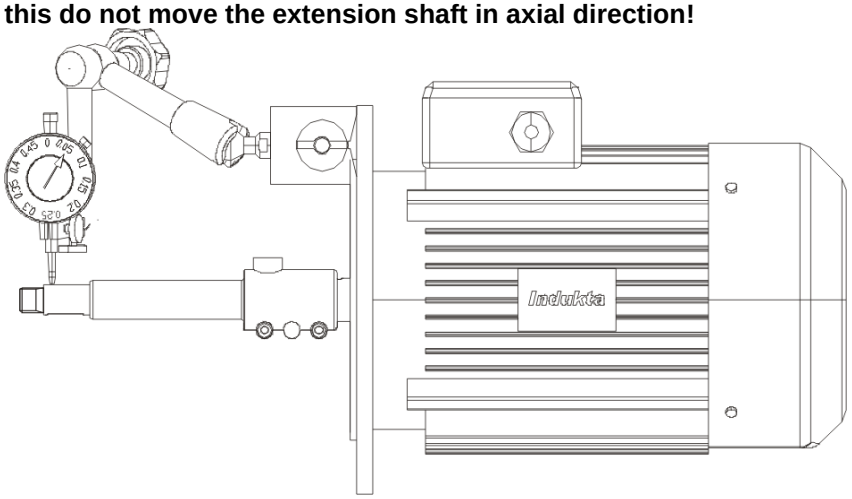
6.2.4. Adjusting the extension shaft

For versions KAM and KAV **before the final assembly** first the extension shaft must be adjusted on the motor shaft to set the proper gap between the impeller and the pump casing later.

1. Inspect the extension shaft for radial play and replace if necessary.
2. Fit the extension shaft (28). Do not completely tighten the fixation screws, a slight axial movement of the shaft must be possible.
3. Fit the pump casing (15).
4. Fit the impeller (16) and the shaft nut (9).
5. Axially adjust the extension shaft to obtain a resulting gap of 0.3 mm between the impeller and the pump casing. Place a feeler gauge of 0.3 mm behind the impeller. Subsequently tighten the fixation screws.



6. Unscrew the shaft nut and remove the impeller. Remove the pump casing.
7. Check the extension shaft for oscillation. This must not be more than 0.05 mm. If necessary correct the oscillation by loosening/tightening the fixation screws. **Attention: when doing this do not move the extension shaft in axial direction!**



8. Assemble the pump according to the instructions in the previous paragraph.

6.3. Replacing the bearings of an IGH type pump

☛ *First dismantle the pump unit to the extent that the following parts can be reached and can be dismantled.*

6.3.1. Removing the bearings

1. Remove the pump cover.
2. Remove the shaft nut and the impeller.
3. Remove the pump casing and the mechanical seal.
4. Remove the hydraulic motor (54) and the coupling (57).
5. Remove the oil seal holder (63) and pull the shaft with the front end bearing (46) out of the bearing bracket.
6. When the front end bearing is free, remove the inner circlip (45) from the bearing bracket.
7. Pull the shaft completely out of the bearing bracket.
8. Remove the outer circlip (48) and remove the rear end bearing (46) from the shaft.

6.3.2. Installing the bearings

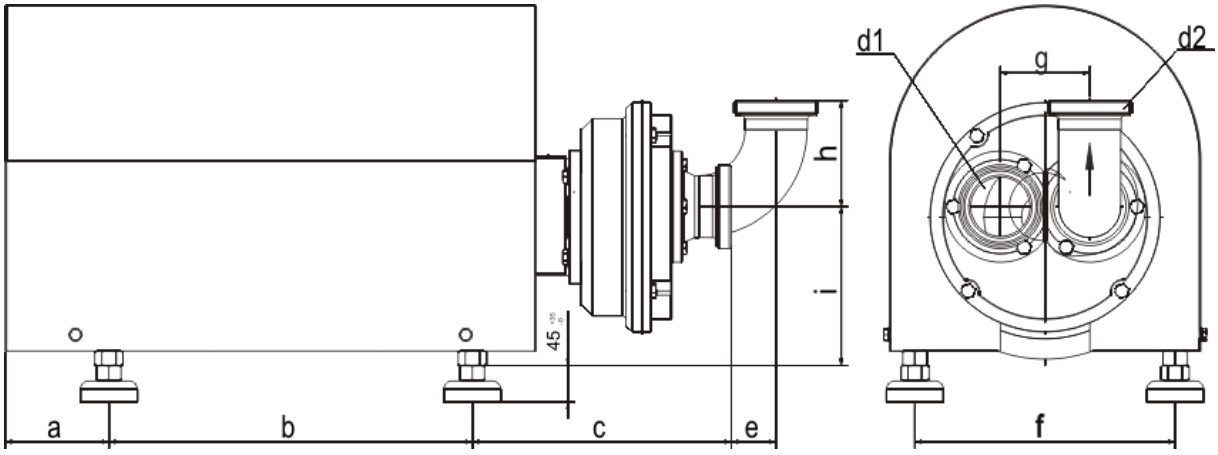
! **First check the oil seal (64) in the oil seal cover (63). Replace it if it is damaged!**

☛ *Lubricate the inner and outer ring of the bearing, shaft and bearing seats in order to prevent seizing up.*

1. Install both bearings (46) on the shaft and fit the outer circlip (48).
2. Introduce the shaft into the bearing bracket. When the rear end bearing has passed the inner circlip groove, fit the inner circlip (45).
3. Push the shaft with the front end bearing against the inner circlip.
4. Install the oil seal cover (63) with the oil seal (64). Ensure the oil seal is positioned properly and sits squarely in the cover!
5. Install the coupling (57) and the hydraulic motor (54).

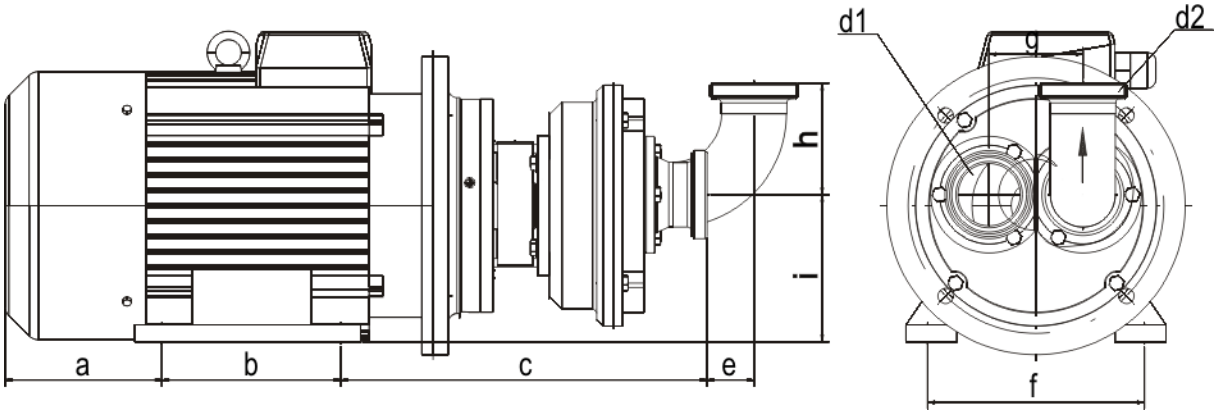
7. Dimensions

7.1. SP-RL KAM



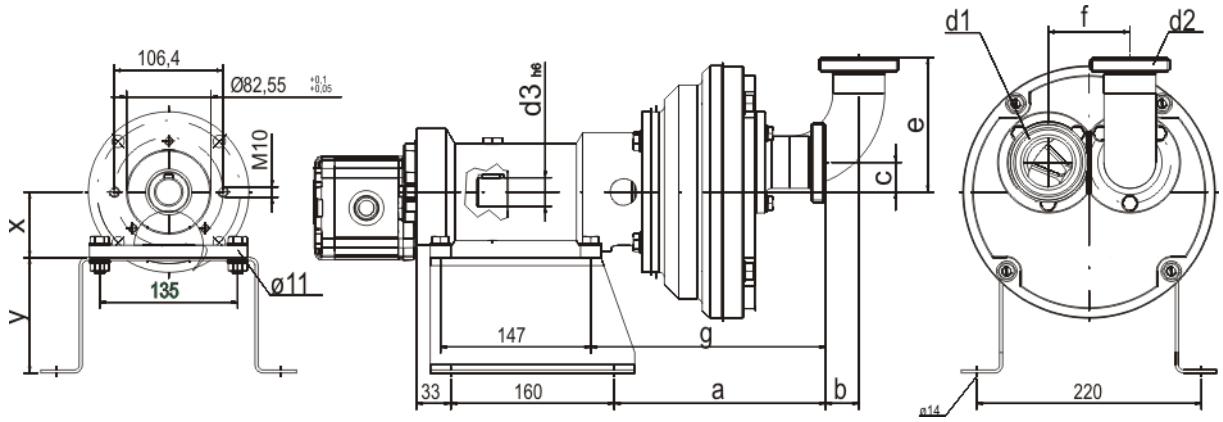
type	d1	d2	P[kW]	a	b	c	e	f	g	h	i
SP-RL 186	2"	2"	2.2	32	390	234	32	200	80	102	134
SP-RL 186	2"	2"	3	32	390	234	32	200	80	102	134
SP-RL 186	2"	2"	4	32	390	234	32	200	80	102	146
SP-RL 232	2.5"	2.5"	7.5	32	452	241	42	250	94	131	168
SP-RL 232	2.5"	2.5"	11	128	447	318	42	320	94	131	214

7.2. SP-RL KAV



type	d1	d2	P[kW]	a	b	c	e	f	g	h	i
SP-RL 186	2"	2"	2.2	158	140	321	32	160	80	102	129
SP-RL 186	2"	2"	3	158	140	321	32	160	80	102	129
SP-RL 186	2"	2"	4	146	140	328	32	190	80	102	141
SP-RL 232	2.5"	2.5"	7.5		178	374	42	216	94	131	163
SP-RL 232	2.5"	2.5"	11	184	210	429	42	216	94	131	191

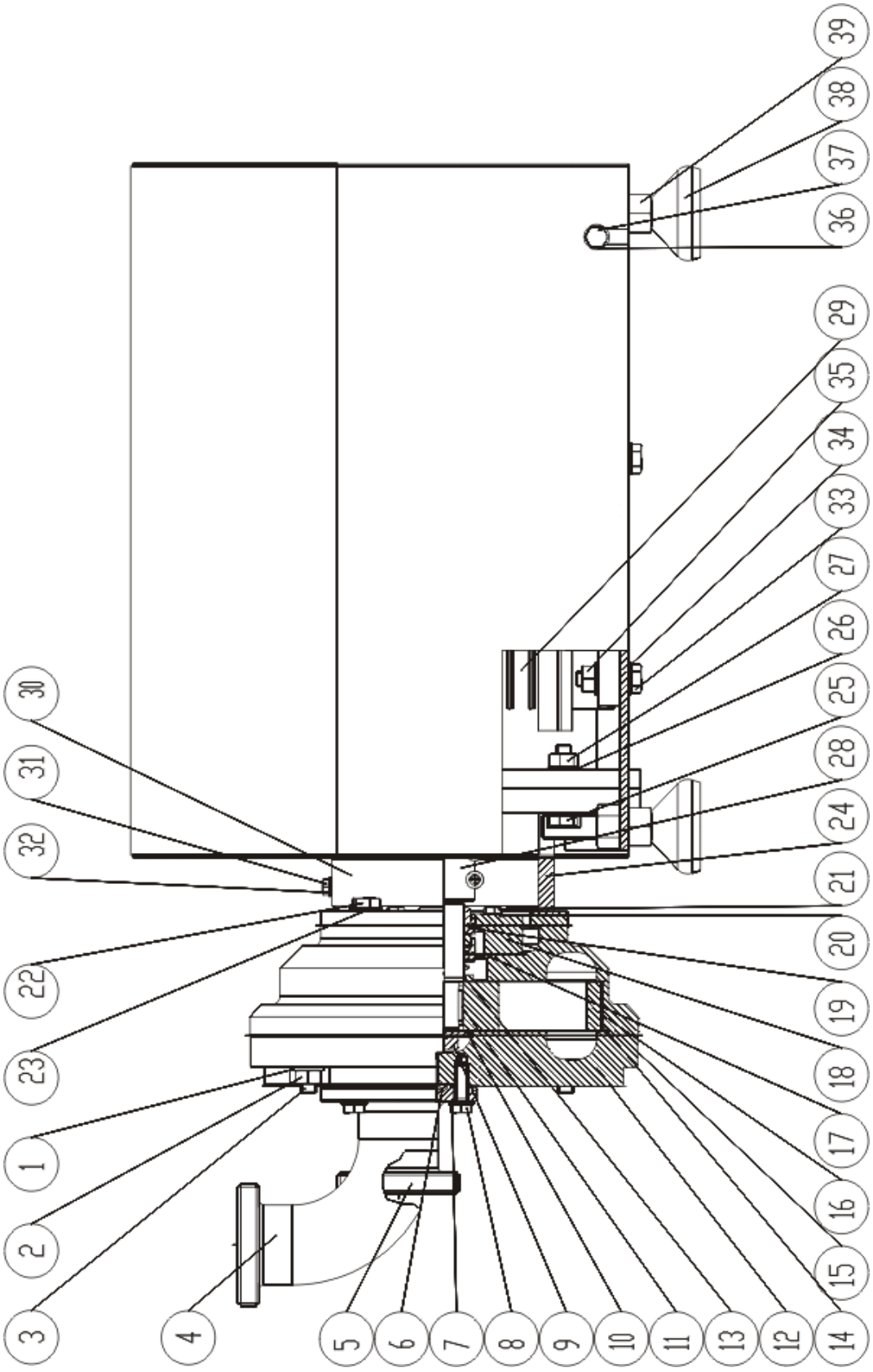
7.3. SP-RL IGH



type	d1	d2	d3	a	b	c	e	f	g	x
SP-RL 186	2"	2"	28	207	32	29	131	80	230	113
SP-RL 232	2.5"	2.5"	28	221	42	31	162	94	244	113

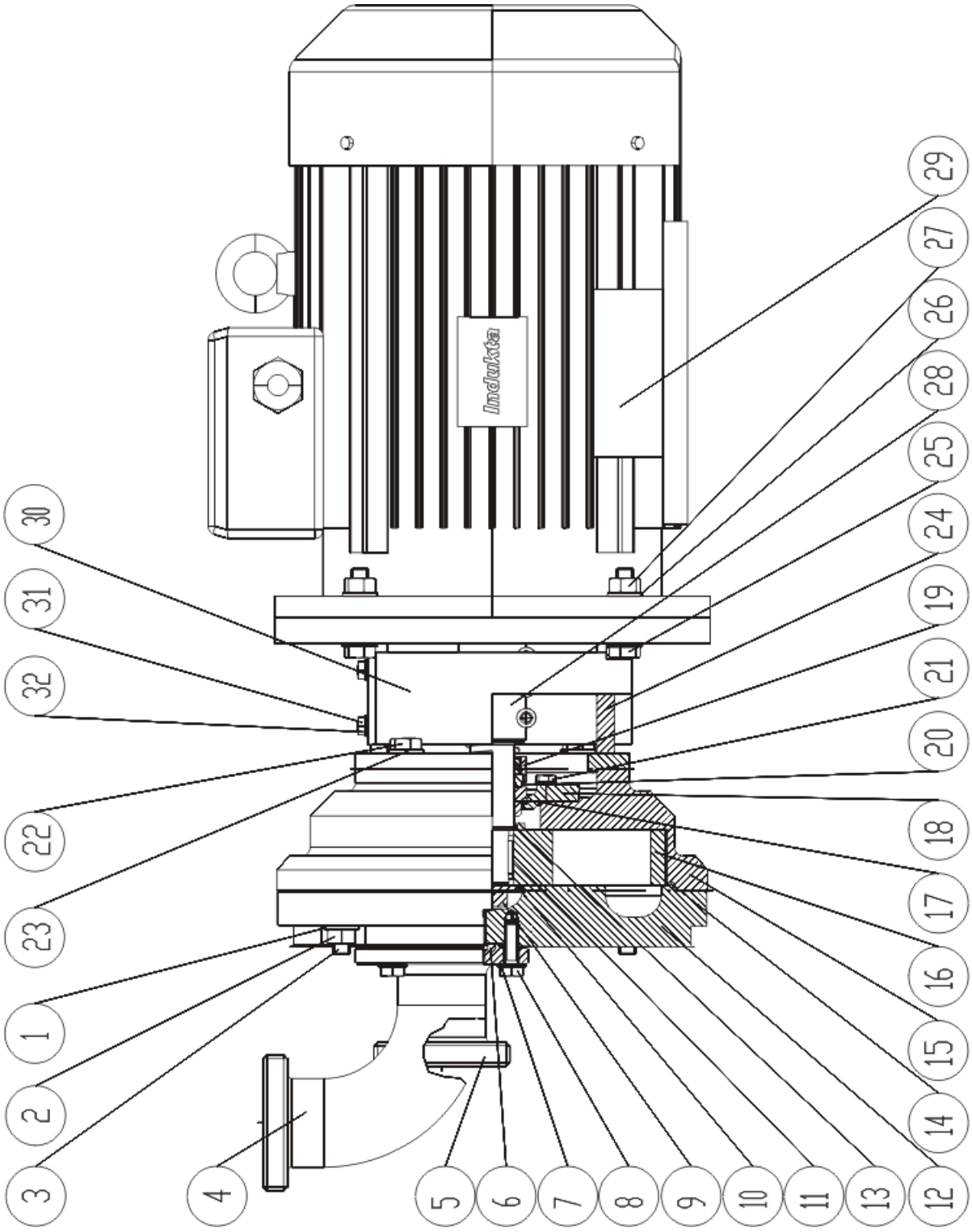
8. Sectional drawings and parts lists

8.1. KAM construction



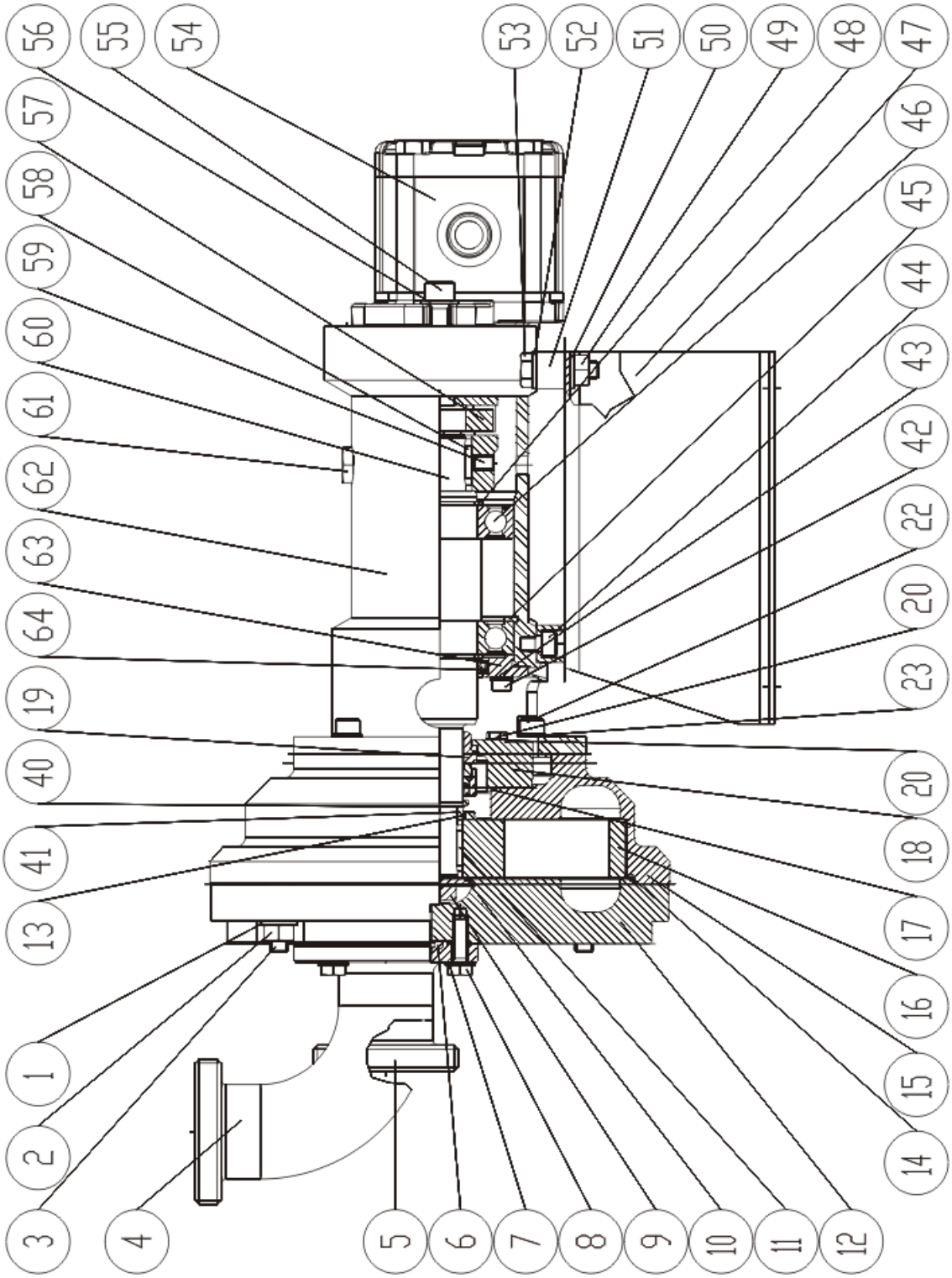
KAM	
Item Nr.	**Description**
1	washer
2	hex nut
3	stud
4	discharge connection
5	suction connection
6	O-ring
7	washer
8	hex head bolt
9	shaft nut
10	O-ring
11	key
12	pump cover
13	O-ring
14	O-ring
15	pump casing 2K
16	impeller
17	O-ring
18	seal seat
19	internal mechanical seal
20	washer
21	hex head bolt
22	hex head bolt
23	washer
24	lantern piece
25	hex head bolt
26	washer
27	hex nut
28	extension shaft
29	electric motor
30	protective cover
31	hex head bolt
32	washer
33	hex head bolt
34	washer
35	hex nut
36	washer
37	hex head bolt
38	adjustable foot
39	hex nut

8.2. KAV construction



KAV	
Item Nr.	**Description**
1	washer
2	hex nut
3	stud
4	discharge connection
5	suction connection
6	O-ring
7	washer
8	hex head bolt
9	shaft nut
10	O-ring
11	key
12	pump cover
13	O-ring
14	O-ring
15	pump casing 1K
16	impeller
17	O-ring
18	seal seat
19	external mechanical seal
20	washer
21	hex head bolt
22	hex head bolt
23	washer
24	lantern piece
25	hex head bolt
26	washer
27	hex nut
28	extension shaft
29	electric motor
30	protective cover
31	hex head bolt
32	washer

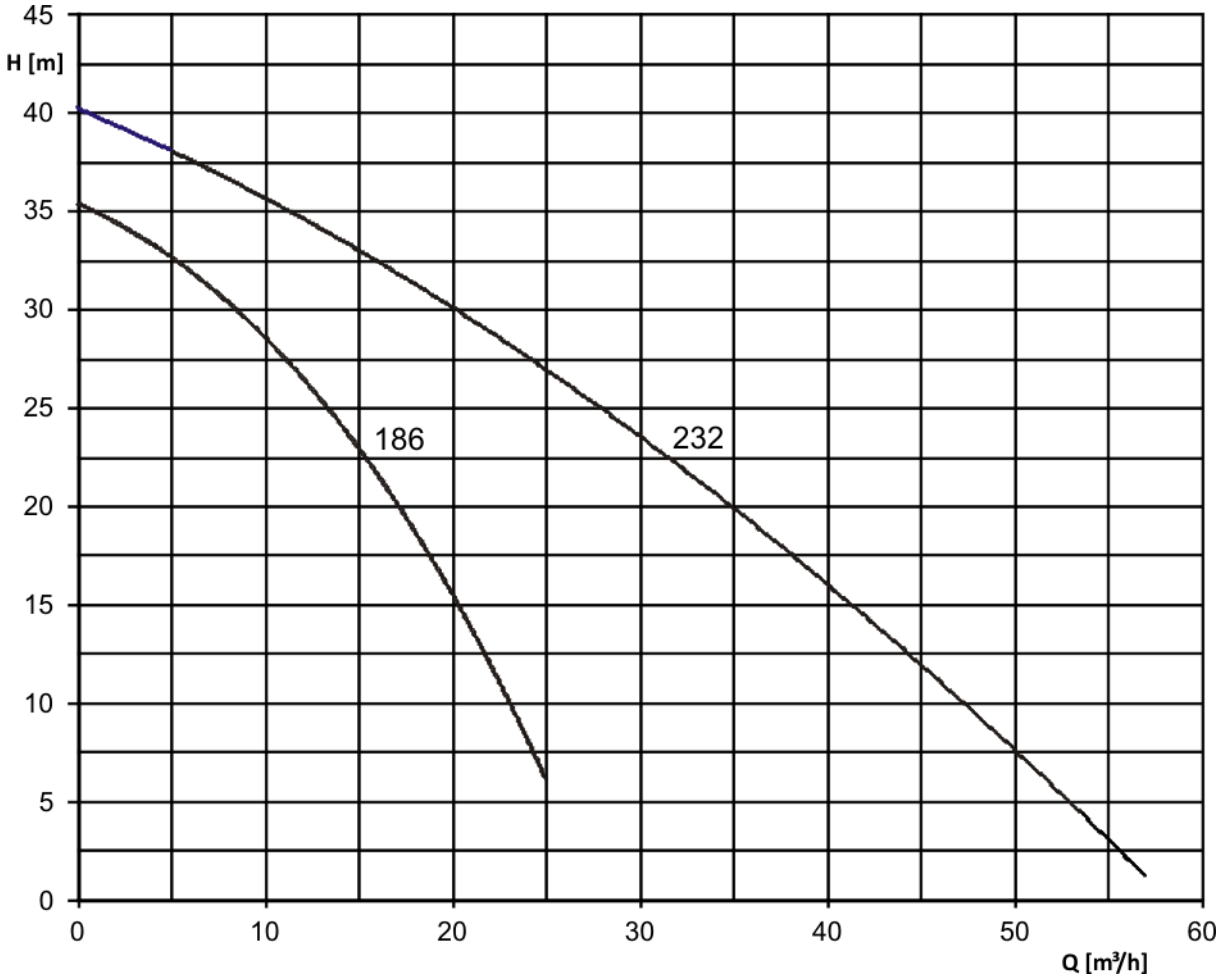
8.3. IGH construction



IGH	
Item Nr.	**Description**
1	washer
2	hex nut
3	stud
4	discharge connection
5	suction connection
6	O-ring
7	washer
8	hex head bolt
9	shaft nut
10	O-ring
11	key
12	pump cover
13	O-ring
14	O-ring
15	pump casing 2K
16	impeller
17	O-ring
18	seal seat
19	internal mechanical seal
20	washer
21	hex head bolt
22	inner hex bolt
23	washer
40	O-ring
41	set ring
42	inner hex bolt
43	washer
44	inner hex bolt
45	inner circlip
46	ball bearing
47	mounting bracket
48	outer circlip
49	hex nut
50	washer
51	strip
52	washer
53	hex nut
54	hydraulic motor
55	inner hex bolt
56	spring washer
57	coupling
58	key
59	set screw
60	shaft
61	plug
62	bearing bracket
63	oil seal holder
64	oil seal

9. Performance curves SP-LR 180 & 232

speed 1500 rpm
s.w. 1000 kg/m3
viscosity 1 cP



10. Trouble shooting

A malfunction in a pump system may have various causes. The malfunction is not always necessarily in the pump itself, but can also be caused by a malfunction in the piping system, or in another appendage in the system. If the operating conditions differ too greatly from the specifications by which the pump was purchased this can also cause malfunctioning. Therefore always check first:

- Has the pump been installed correctly?
- Are the operating conditions still according to the initial specifications?
- Are the other appendages in the pipe system functioning correctly?
-

In general terms, the following malfunctions in a pump can be distinguished:

1. pump gives no or little liquid
2. pump does not reach duty point
3. pump gives irregular liquid flow
4. pump leaks
5. pump vibrates excessively
6. pump makes too much noise
7. motor overheats
8. pump cuts out thermally
9. pomp has seized

The table on the next page gives a possible cause and solution for the malfunctions mentioned above:

Malfunction										Cause	Action
1	2	3	4	5	6	7	8	9			
	✔				✔	✔				electrical connection defective	Have qualified electrician check the electric connections
	✔									wrong rotation direction	Have qualified electrician reverse the sense of rotation of the electric motor
✔	✔	✔			✔					insufficient pre-pressure	Increase the pre-pressure or place the pump on a lower position
	✔						✔			pump operating at the wrong speed	Check the motor speed
								✔		contaminations or objects in the pump	Clean the pump, if necessary disassemble
✔	✔	✔								air in the piping	Inspect the piping
	✔									valve in suction pipe is not completely open	Entirely open the valve in the suction pipe
	✔									pump selected with too small delivery head	Install another pump
✔	✔	✔						✔		suction pipe or filter blocked	Clean the suction pipe or the filter
			✔							shaft seal defective	Disassemble the pump and replace the shaft seal
			✔							O-ring seal defective	Disassemble the pump and replace the O-ring seal
							✔			liquid temperature is too high	Decrease the liquid temperature
✔							✔	✔		impeller is jammed	Disassemble the pump and replace the impeller
				✔	✔		✔	✔		impeller is damaged	Disassemble the pump and replace the impeller
				✔	✔	✔	✔	✔		motor shaft is bent	Replace the motor
				✔	✔	✔	✔	✔		extension shaft is loose	Disassemble the pump, inspect the extension shaft, reassemble it and readjust.
				✔	✔	✔	✔	✔		bearings are damaged or worn	Replace the motor. For IG(F): replace the bearings
							✔	✔		motor is overloaded	Check the viscosity of the liquid. Switch off the motor and check if the pump does not drag. If so, disassemble the pump and repair it

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