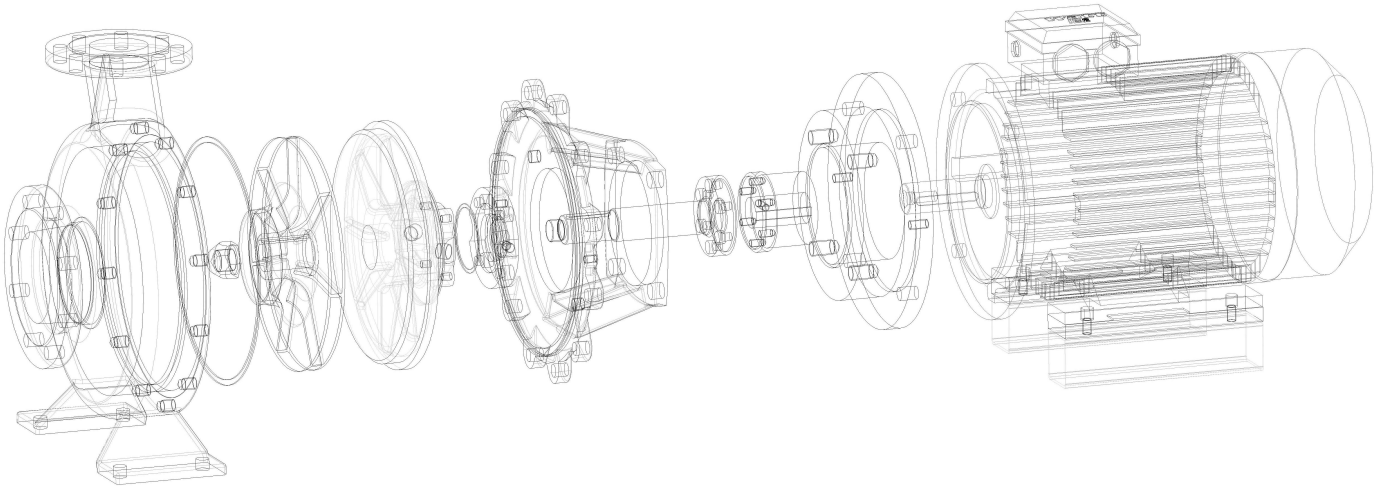
SIVAG
PUMPEN AUSTRIA

Maintenance- and Service Manual



VOLUTE CASING
BLOC Pumps DIN 24256 NCB

CONTENTS

1. Installation of centrifugal pumps

1.1. Storage

Mind the following instructions for correct storage:

- placement of pumps without interference of vibrations to avoid damage of the bearing
- close inlet and outlet of the pump with caps
- fill all non emptying hollows with anti-freeze
- for impeller and casing made of grey cast iron splash corrosion inhibitor into the sealing gaps
- remove gland packing
- protect electric motor against dust and moisture

1.2. Transport

Transport of pump unit should be effected as careful as possible because of the risc of damaging the terminal box and fan casing.
It is never allowed to lift the pump or motor on the shaft (fig. 1).

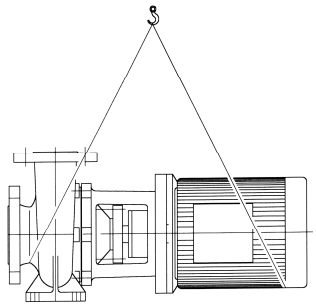


fig. 1

1.3. Installation

The pump unit should be disposed easy to reach for maintenance and inspection. Consider the location of the pipes and therefore the possibility of assembly. Mind the room for using lifting devices for heavy pumps.

1.4. Foundation

Foundation and mounting of the bed-plate of the pump must be executed carefully. Admissible pipe tensions have to be carried by the foundation therewise the unit is not allowed to be moved at its location.

1.5. Pipe placement and accessories

Suction line: The suction line should be as short as possible and must rise to the suction flange of the pump. If pressure is available an suction side the pipes have to be installed falling to the pump flange to avoid air inclusions in the suction pipe (fig. 2). The diameter of suction pipes should be of a diameter that the velocity in the suction line is max. 2 m/s.

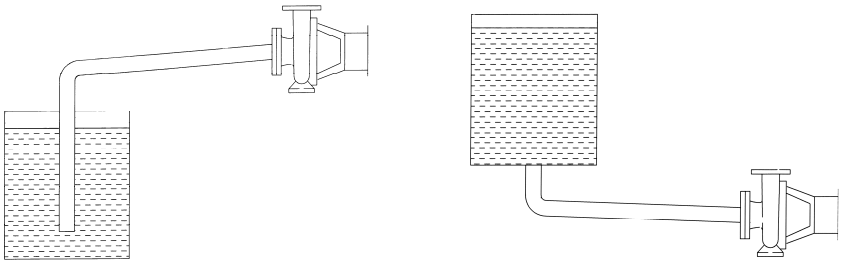


fig. 2

If 2 or more pumps have only one suction line, take care that there are used cone shaped suction pipes with correct angles to avoid turbulences (fig. 3). Valves in the suction line are only used for closing the pipes, but totally open when the pump works.

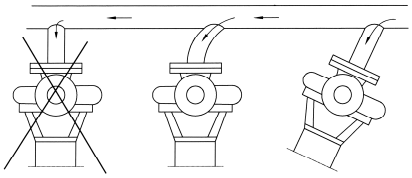


fig. 3

Discharge line: It is recommended to place a valve closed to the discharge flange for exchanging the pump easily without emptying the whole discharge line.
Operates the pump an extended periode against closed valve a by-pass must be installed.
Consider the capacity of electric motor and admissible increase of temperature to avoid cavitation.

2. Operation and maintenance

2.1. Before starting operation

- grease the bearings (grease lubricated)
- open the valves of cooling-, flushing- and blocingwatersystem
- prime pump and suction line and evacuate air from pump casing
  in case of suction operation set non return valve and prime suction pipe with an extra filling pipe to evacuate air when filling from external source.
- check if it is possible to rotate shaft by hand, if not check following:
  - something blocks the impeller
  - nuts for gland packing are tightened too hard
  - contact of impeller and casing
- control sense of rotation marked by an arrow on the pump, to avoid damage of the pump that is possible when the pump runs for a longer periode in wrong sense.

2.2. Starting operation

- close discharge valve
- control shaft sealing
  gland packing: soft packing must have a leakage between 10 and 20 drops per minute. Is the leakage less or gets the gland packing worm lower the nuts till the leakage is right.
  mechanical seal: they are not allowed to have leakage, except a few minutes after the first start in which the rotating and stationary part of mechanical seal get closed
- open the discharge valve for the target flow. The electric motor can be overheated by capacities higher then recommended on the type plate
- adjust the quantity of cooling- and blocking water

2.3. Check after some hours

- check the leakage of the gland packing
- check temperature and noise of the bearings
  temperature stabilisates after some hours in some cases after one day.
- check the running of the whole unit

2.4. Maintenance during operation

- shaft sealing: replace mechanical seal in event of leakage
  control soft packing

3. Foult finding

Before looking into technical matters of disfunction in operation check the main datas like capacity of pump, required head and installed motor power in relation to the required power of the pump.

3.1. Pump does not deliver expected capacity

- wrong sense of rotation
- suction of air caused by:
  - liquid level in the reservoir of supply is too low
  - liquid disengages air or gases
  - suction line leakes or inclusion of air
  - air is sucked through the shaft sealing
- wrong design of the suction line (cause cavitation and turbulences)
- too large distance between casing and impeller
- blocked impeller
- friction of pipes and deposits inside

3.2. Leakage of shaft sealing

gland packing:

- damaged packing rings
- wrong mounted
- less or no pressure on priming ring
- vibrations of the shaft

mechanical seal:

- wrong assembly
- vibrations
- blocked mechanical seal caused by soiling
- crackings in the stationary or rotary ring
- damage of the o-rings
- damaged or worn out mechanical seal
- too low pressure of flushing water at double mechanical seal

3.3. Vibrations

- sand, stones or other solids in the casing
- not correctly fixing of the pump unit
- turbulences in supply
- capacity too low
- cavitation (noise)
- foults in the planing of unit

4. Assembling and disassembling

4.1. Disassembling

- loosen casing screws and remove bearing unit (part 6) with casing cover, impeller and shaft (use 2 crowbars for careful removing from the casing)
- remove impeller nut (part 14) with safety loop (part 15) and remove impeller with 2 crowbars placed between casing cover and impeller behind 2 impeller blades.

4.2. Disassembling of single mechanical seal

- pull out rotary ring of the mechanical seal
- remove casing cover (part 5)
- remove mechanical seal cover with the stationary ring

4.3. Disassembling of gland packing

- remove gland packing flange
- remove packing ring and soft packing (part 25) and if installed also priming ring (part 27)

4.4. Exchanging of the electric motor

Remove bolts and nuts of flange connection between pump and motor and pull out the motor.

4.5. Assembling of mechanical seal

Assembling in the opposite sequence of disassembling in accordance to the mechanical seal manufacturers manual.

4.6. Assembling of pump

- assembling in the opposite sequence of disassembling

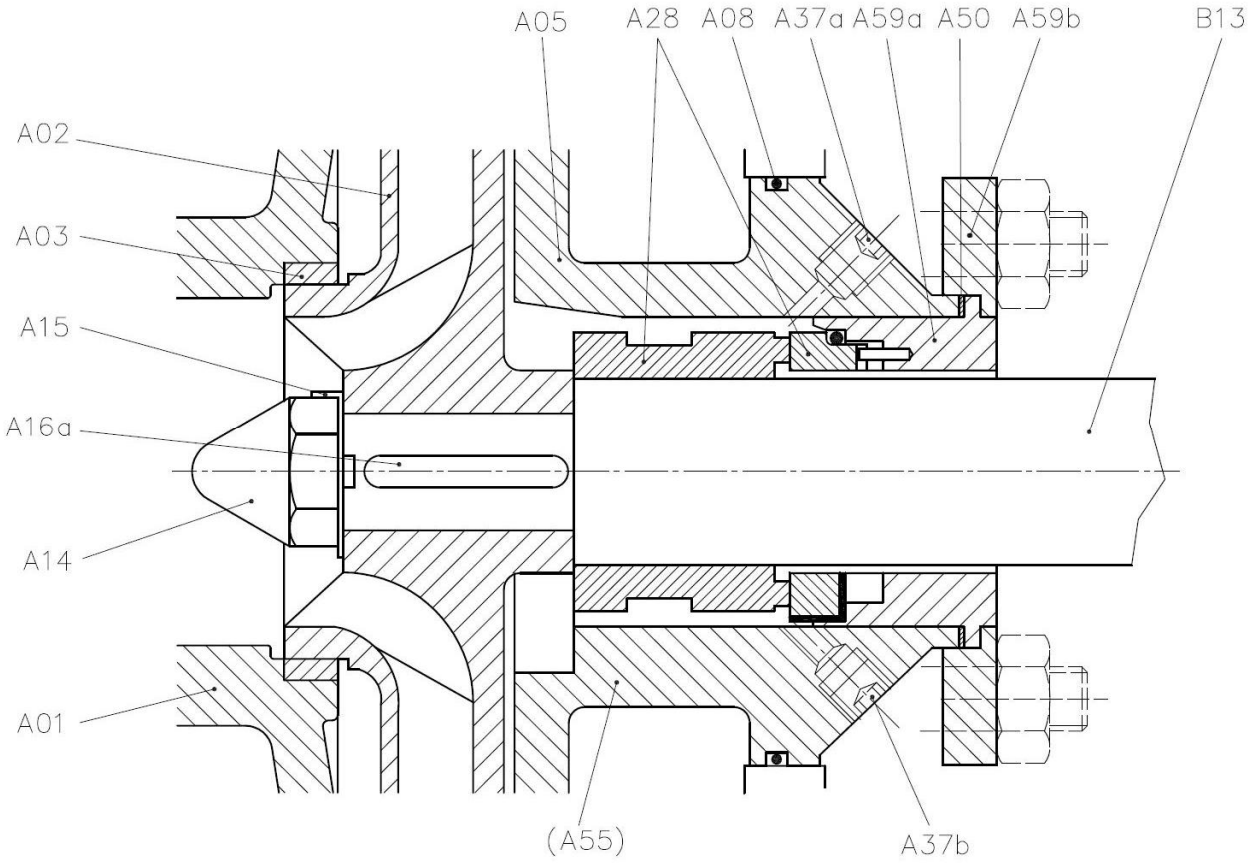
ATTENTION!
When assemble a new shaft it's very important to control the balance of the shaft with a dial gage. Approx one tenth is tolerance.

5. Shaft Seal

5.1. Single acting mechanical seal

Wellenabdichtung durch einfach wirkende Gleitringdichtung (Kurzbeschreibung S)	Shaft sealing with single mechanical seal (Code S)

S1



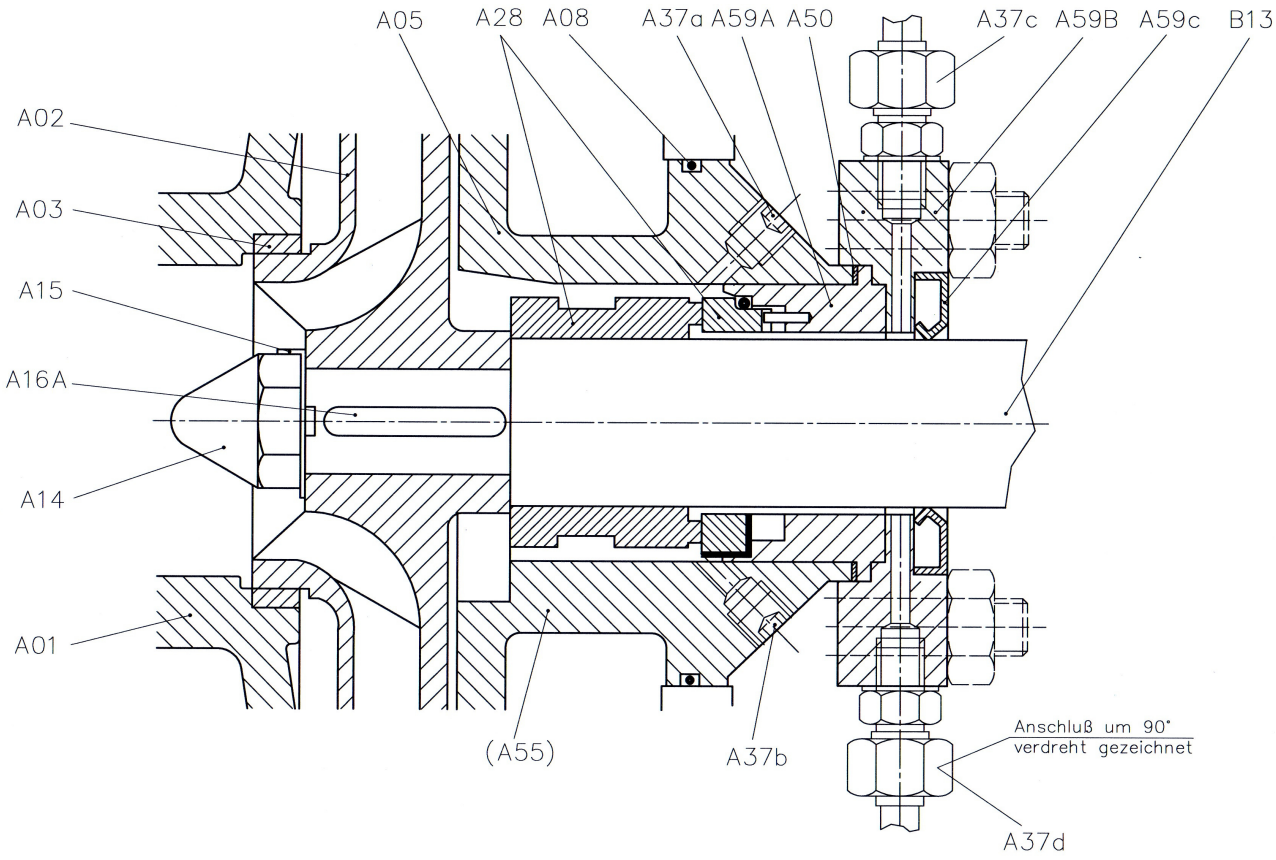
The sliding faces are pressed against each other by means of spring force, thus preventing the opening of the seal at stand-still. The seal faces are statically sealed against the housing and the shaft by secondary seals. With the entry of the pumped medium into the minimal sealing gap a lubricating film is generated and the sealing effect is thus obtained.

5.2. Construction single-acting mechanical seal with quench

Abdichtung durch Quench (Kurzbeschreibung Q)	Shaft sealing with quench (Code Q)

S1.Q3

Mediumsseitig einfache Gleitringdichtung und atmospährenseitig Wellendichtring. 2 Anschlüsse vorbereitet für Zu- und Ableitung einer externen Sperrflüssigkeit.	Medium side single mechanical seal and atmosphere side radial seal ring. 2 connections for foreign flushing liquid.



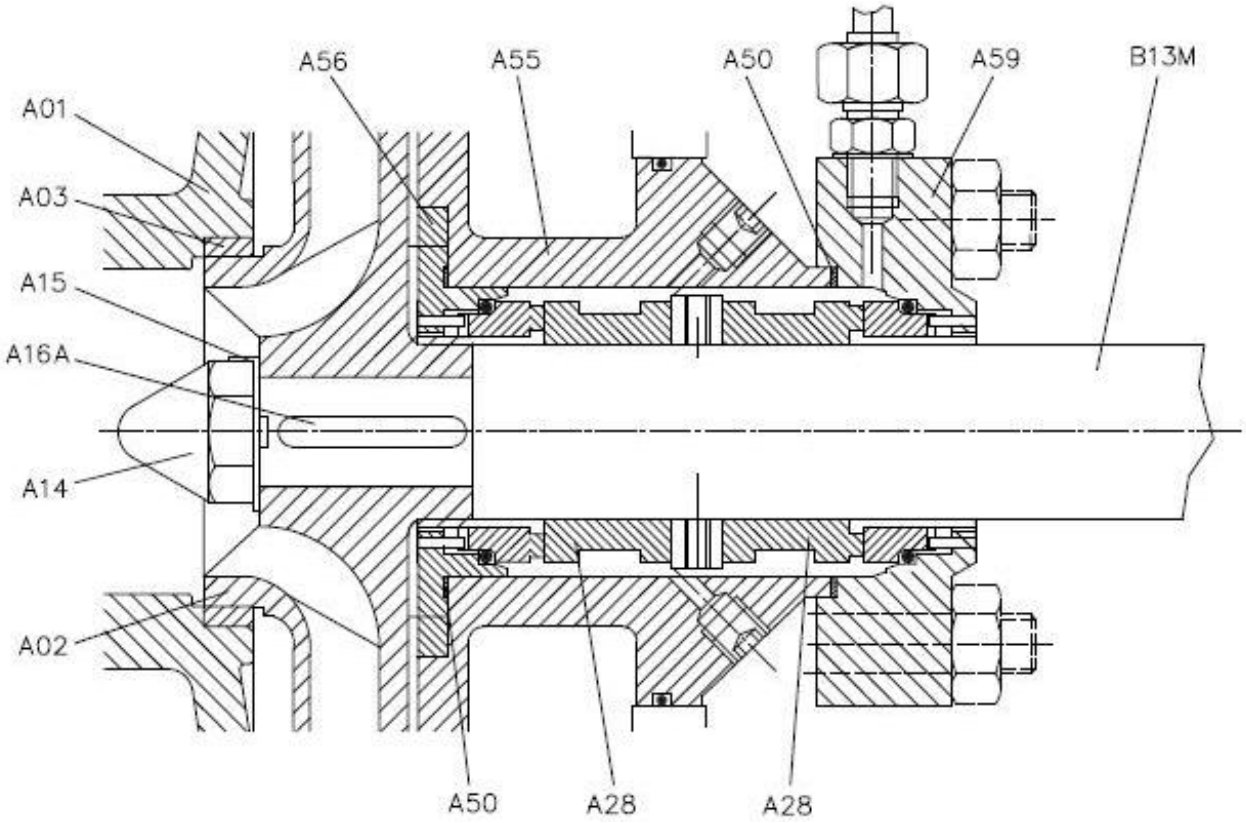
ATTENTION: The plug screw pos. A37d must be unclosed during the filling of the sealing medium box. Until the sealing medium discharge at the plug screw you must let open the outlet. So you prevent the creation of air cushion. Then close the plug screw again.

5.3. Shaft sealing with double mechanical seal in assembly “back to back”

Abdichtung durch Doppelgleitringdichtung (Kurzbeschreibung D)	Shaft sealing with double mechanical seal (Code D)

D1

Doppelgleitrindichtung mediumsseitig und atmosphärenseitig nicht entlastet, mit Fremdflüssigkeit als Sperrmedium.	Double mechanical seal, medium- and atmosphere side unbalanced, with foreign flushing liquid.



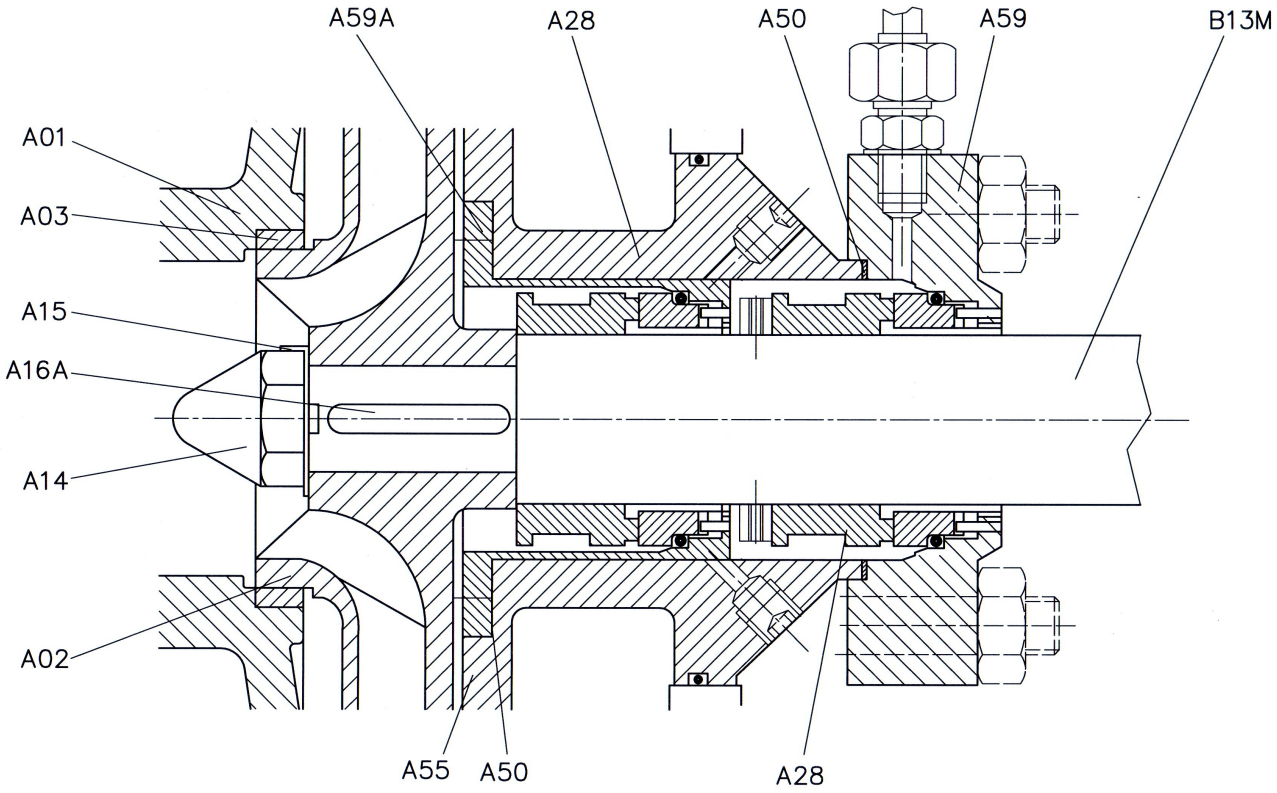
The pressure in the cavity between the two seals have to be ca. 1 bar over the working point of the pump. So it can be guarantee that the sealing faces are flushed only with pure medium.
The differential pressure shouldn’t overstep 4 bar, because of increasing abrasion and invalid heating of the mechanical seal.
The sealing medium always have to circulate.

5.4. Shaft sealing with double mechanical seal in assembly “tandem”

Abdichtung durch Doppelgleitringdichtung (Kurzbeschreibung D)	Shaft sealing with double mechanical seal (Code D)

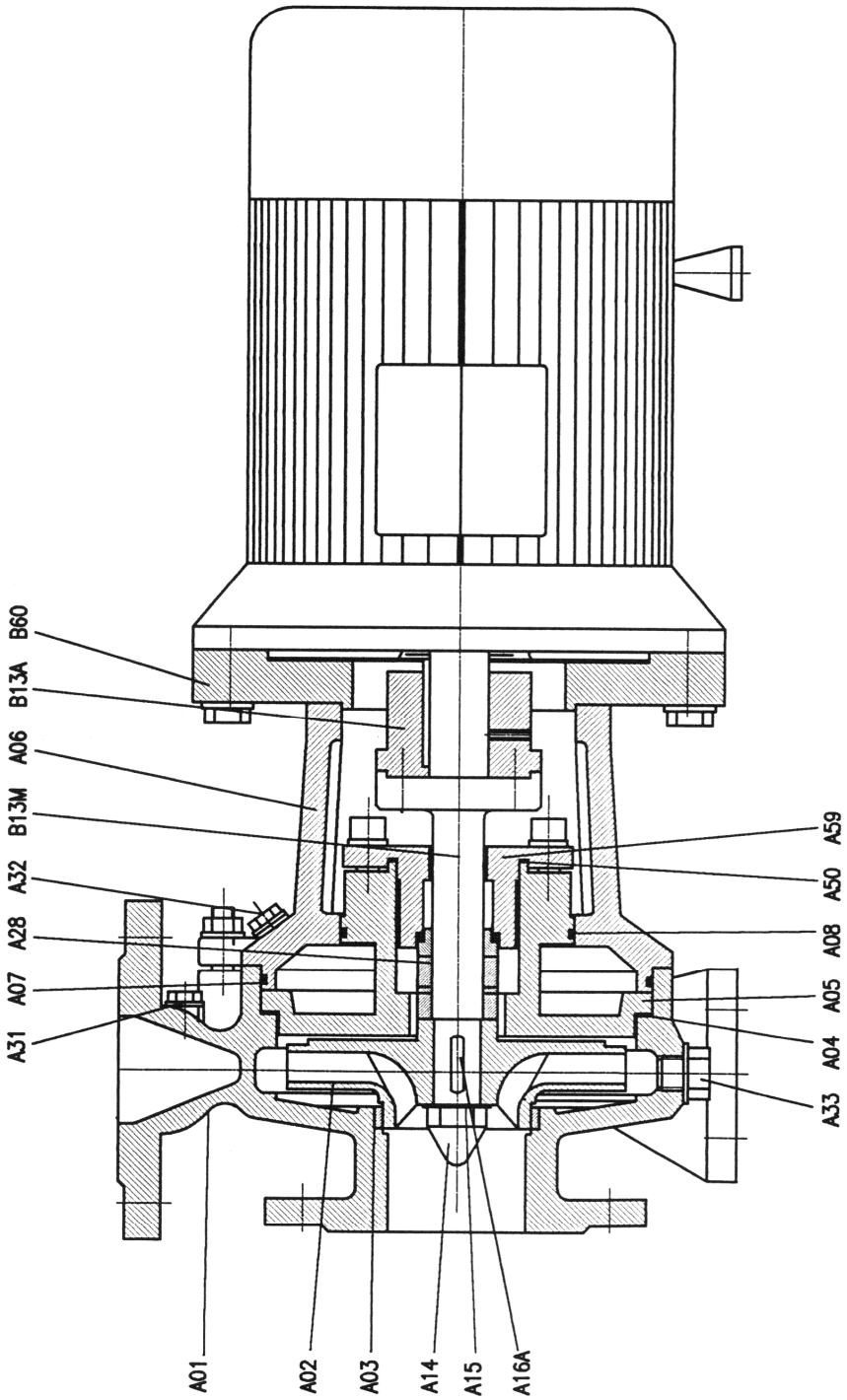
D2

Doppelgleitrindichtung mediumsseitig und atmosphärenseitig nicht entlastet, mit Fremdflüssigkeit als Sperrmedium.	Double mechanical seal, medium- and atmosphere side unbalanced, with foreign flushing liquid.



The sealing room will be flushed non-pressurized with the sealing medium.
The sealing medium always have to circulate.

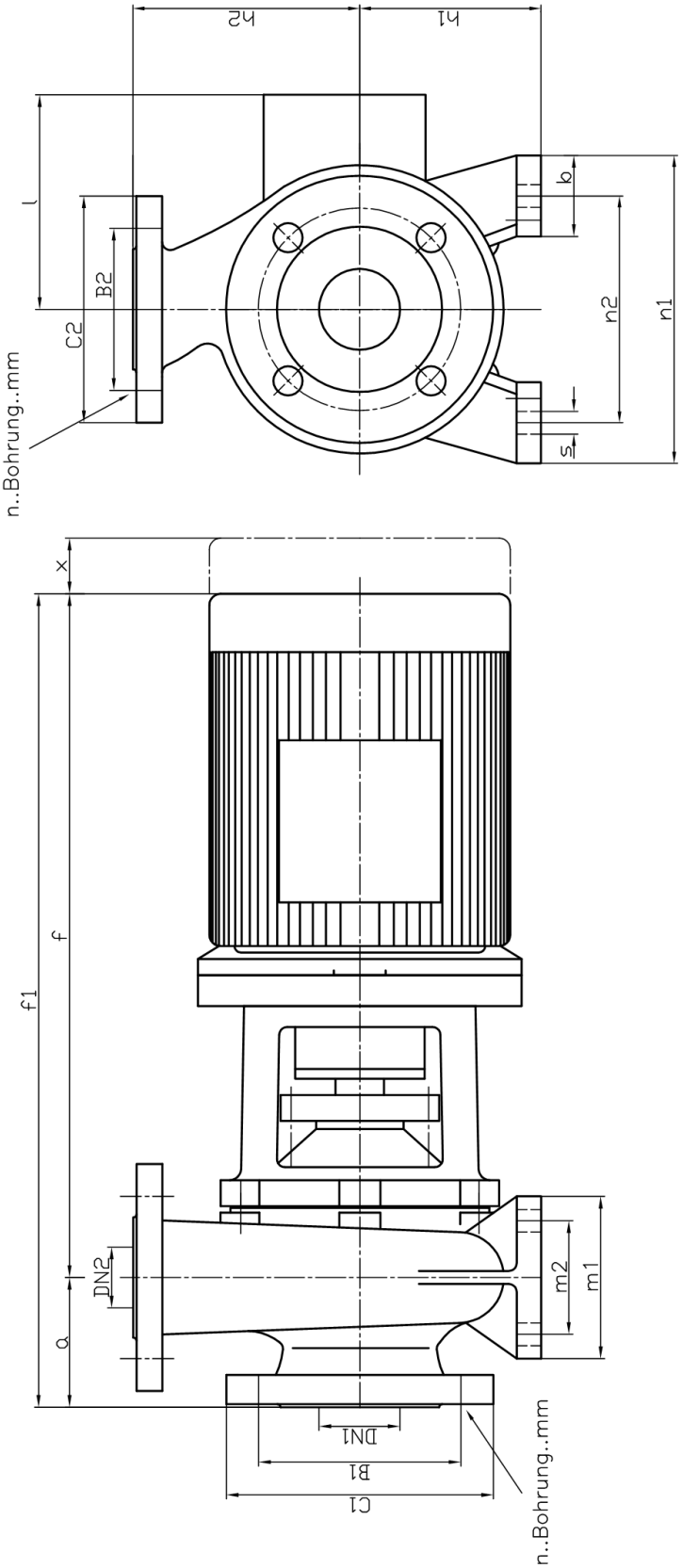
6. sectional drawing



7. Parts designation

7.1. Position	**Bezeichnung**	*7.2. designation*
A01	Pumpengehäuse	*pump casing*
A02	Laufrad	*impeller*
A03	Spaltring	*wear ring*
A04	Gehäusedichtung	*casing gasket*
A05	Pumpendeckel	*casing cover*
A06	Laterne	*lantern*
A07	O-Ring	*o-ring*
A08	O-Ring	*o-ring*
B13M	Welle	*shaft*
B13A	Wellenbüchse	*key shaft sleeve*
B60	Zwischenflansch	*flange*
A14	Laufradmutter	*impeller nut*
A15	Sicherungsblech	*locking plate*
A16A	Passfeder	*key*
A28	Gleitringdichtung	*mechanical seal*
A32	Verschlussschraube	*plug*
A33	Verschlussschraube	*plug*
A50	GLRD-Trägerdichtung	*mech. seal cover gasket*
A59	Gleitringdichtungsträger	*mechanical seal cover*

8. Maßbild


h2
h1
l
B2
C2
n..Bohrung..mm
b
n2
n1
s
x
f1
f
DN2
a
m2
m1
DN1
B1
C1
n..Bohrung..mm

2900 min-1 (Maße in mm)																								
	Type	E-Motor																						
Nr.	2900 min-1	kW	A	DN1	C1	B1	n	DN2	C2	B2	n	a	f	f1	h1	h2	b	m1	m2	n1	n2	s	l	x
1	32/125-0,75/2	0,75	2,2	50	165	125	4	32	140	100	4	80	414	494	112	140	50	100	70	190	140	13	137	100
1	32/125-1,1/2	1,1	2,8	50	165	125	4	32	140	100	4	80	414	494	112	140	50	100	70	190	140	13	137	100
1	32/125-1,5/2	1,5	3,7	50	165	125	4	32	140	100	4	80	417	497	112	140	50	100	70	190	140	13	150	100
2	32/160-2,2/2	2,2	5,3	50	165	125	4	32	140	100	4	80	442	522	132	160	50	100	70	240	190	13	150	100
2	32/160-3,0/2	3	7,3	50	165	125	4	32	140	100	4	80	484	564	132	160	50	100	70	240	190	13	154	100
3	32/200-4,0/2	4	9,3	50	165	125	4	32	140	100	4	80	505	585	160	180	50	100	70	240	190	13	166	100
3	32/200-5,5/2	5,5	12	50	165	125	4	32	140	100	4	80	598	678	160	180	50	100	70	240	190	13	205	100
4	32/250-7,5/2	7,5	16	50	165	125	4	32	140	100	4	100	605	705	180	225	65	126	95	320	260	13	205	100
4	32/250-11/2	11	22	50	165	125	4	32	140	100	4	100	695	795	180	225	65	126	95	320	260	13	205	130
7	40/200-5,5/2	5,5	12	65	185	145	4	40	150	110	4	100	598	698	160	180	50	100	70	265	212	13	205	100
7	40/200-7,5/2	7,5	16	65	185	145	4	40	150	110	4	100	598	698	160	180	50	100	70	265	212	13	205	100
7	40/200-11/2	11	22	65	185	145	4	40	150	110	4	100	688	788	160	180	50	100	70	265	212	13	205	130
8	40/250-11/2	11	22	65	185	145	4	40	150	110	4	100	695	795	180	225	65	125	95	320	250	13	205	130
8	40/250-15/2	15	30	65	185	145	4	40	150	110	4	100	695	795	180	225	65	125	95	320	250	13	266	130
9	40/215-15/2	15	30	65	185	145	4	40	150	110	4	125	695	820	200	250	65	125	95	345	280	13	266	130
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12	50/200-11/2	11	22	80	200	160	8	50	165	125	4	100	688	788	160	200	50	100	70	265	212	13	205	130
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17	65/200-15/2	15	30	100	200	180	8	65	185	145	4	100	695	795	180	225	65	125	95	320	250	13	266	130
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18	65/250-30/2	30	55	100	200	180	8	65	185	145	4	125	958	1083	200	250	80	160	120	360	280	18	540	130
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20	80/160-11/2	11	22	100	200	180	8	80	200	160	8	100	695	795	180	200	65	125	95	280	212	13	205	130
21	80/200-18,5/2	18,5	36	125	250	210	8	80	200	160	8	125	775	900	180	250	65	125	95	345	280	13	266	130
21	80/200-22/2	22	42	125	250	210	8	80	200	160	8	125	773	898	180	250	65	125	95	345	280	13	274	130
21	80/200-30/2	30	55	125	250	210	8	80	200	160	8	125	936	1061	180	250	65	125	95	345	280	13	540	130
26	100/200-30/2	30	55	125	250	210	8	100	200	180	8	125	936	1061	200	280	80	160	120	360	280	18	540	130

1450 min-1 (Maße in mm)

	Type	E-Motor																						
Nr.	1450 min-1	kW	A	DN1	C1	B1	n	DN2	C2	B2	n	a	f	f1	h1	h2	b	m1	m2	n1	n2	s	l	x
1	32/125-0,25/4	0,25	0,9	50	165	125	4	32	140	100	4	80	389	469	112	140	50	100	70	190	140	13	127	100
1	32/125-0,37/4	0,37	1,2	50	165	125	4	32	140	100	4	80	389	469	112	140	50	100	70	190	140	13	127	100
2	32/160-0,55/4	0,55	1,7	50	165	125	4	32	140	100	4	80	414	494	132	160	50	100	70	240	190	13	137	100
2	32/160-0,75/4	0,75	2,2	50	165	125	4	32	140	100	4	80	414	494	132	160	50	100	70	240	190	13	137	100
3	32/200-0,55/4	0,55	1,2	50	165	125	4	32	140	100	4	80	414	494	160	180	50	100	70	240	190	13	137	100
3	32/200-0,75/4	0,75	2,2	50	165	125	4	32	140	100	4	80	414	494	160	180	50	100	70	240	190	13	137	100
4	32/250-1,1/4	1,1	2,8	50	165	125	4	32	140	100	4	100	463	563	180	225	65	126	95	320	260	13	150	100
4	32/250-1,5/4	1,5	3,7	50	165	125	4	32	140	100	4	100	488	588	180	225	65	126	95	320	260	13	150	100
7	40/200-0,75/4	0,75	2,2	65	185	145	4	40	150	110	4	100	414	514	160	180	50	100	70	265	212	13	137	100
7	40/200-1,1/4	1,1	2,8	65	185	145	4	40	150	110	4	100	418	518	160	180	50	100	70	265	212	13	150	100
8	40/250-1,5/4	1,5	3,7	65	185	145	4	40	150	110	4	100	488	588	180	225	65	125	95	230	250	13	150	100
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6	50/160-0,55/4	0,55	1,7	65	185	145	4	50	165	125	4	80	414	494	132	160	50	100	70	240	190	13	137	100
6	50/160-0,75/4	0,75	2,2	65	185	145	4	50	165	125	4	80	414	494	132	160	50	100	70	240	190	13	137	100
12	50/200-1,1/4	1,1	2,8	80	200	160	8	50	165	125	4	100	418	518	160	200	50	100	70	265	212	13	150	100
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13	50/250-2,2/4	2,2	5,3	80	200	160	8	50	165	125	4	125	535	660	180	225	65	125	95	320	250	13	154	100
13	50/250-3/4	3	7,3	80	200	160	8	50	165	125	4	125	535	660	180	225	65	125	95	320	250	13	154	100
14	50/315-4/4	4	9,3	65	185	145	4	50	165	125	4	125	556	681	225	280	65	125	95	345	280	13	166	100
14	50/315-5,5/4	5,5	12	65	185	145	4	50	165	125	4	125	660	785	225	280	65	125	95	345	280	13	205	100
10	65/125-0,55/4	0,55	1,7	80	200	160	8	65	185	145	4	100	414	514	132	160	50	100	70	240	190	13	137	100
10	65/125-0,75/4	0,75	2,2	80	200	160	8	65	185	145	4	100	414	514	132	160	50	100	70	240	190	13	137	100
11	65/160-1,1/4	1,1	2,8	80	200	160	8	65	185	145	4	100	418	518	160	180	50	100	70	265	212	13	150	100
17	65/200-1,5/4	1,5	3,7	100	200	180	8	65	185	145	4	100	492	592	180	225	65	125	95	320	250	13	150	100
17	65/200-2,2/4	2,2	5,3	100	200	180	8	65	185	145	4	100	533	633	180	225	65	125	95	320	250	13	154	100
17	65/200-3/4	3	7,3	100	200	180	8	65	185	145	4	100	533	633	180	225	65	125	95	320	250	13	154	100
18	65/250-4/4	4	9,3	100	200	180	8	65	185	145	4	125	554	679	200	250	80	160	120	360	280	18	166	100
18	65/250-5,5/4	5,5	12	100	200	180	8	65	185	145	4	125	597	722	200	250	80	160	120	360	280	18	205	100
19	65/315-7,5/4	7,5	16	100	200	180	8	65	185	145	4	125	652	777	225	280	80	160	120	400	315	18	205	100
19	65/315-11/4	11	23	100	200	180	8	65	185	145	4	125	797	922	225	280	80	160	120	400	315	18	266	130
15	80/125-0,75/4	0,75	1,2	100	200	180	8	80	200	160	8	100	414	514	160	180	65	125	95	280	212	13	137	100
15	80/125-1,1/4	1,1	2,8	100	200	180	8	80	200	160	8	100	418	518	160	180	65	125	95	280	212	13	150	100
20	80/160-1,5/4	1,5	3,7	100	200	180	8	80	200	160	8	100	488	588	180	200	65	125	95	280	212	13	150	100
21	80/200-2,2/4	2,2	5,3	125	250	210	8	80	200	160	8	125	529	654	180	250	65	125	95	345	280	13	154	100
21	80/200-3/4	3	7,3	125	250	210	8	80	200	160	8	125	529	654	180	250	65	125	95	345	280	13	154	100
21	80/200-4/4	4	9,3	125	250	210	8	80	200	160	8	125	556	681	180	250	65	125	95	345	280	13	166	100
22	80/250-5,5/4	5,5	12	125	250	210	8	80	200	160	8	125	597	722	225	280	80	160	120	400	315	18	205	100
22	80/250-7,5/4	7,5	16	125	250	210	8	80	200	160	8	125	652	777	225	280	80	160	120	400	315	18	205	100
23	80/315-11/4	11	23	125	250	210	8	80	200	160	8	125	797	922	250	315	80	160	120	400	315	18	266	130
23	80/315-15/4	15	31	125	250	210	8	80	200	160	8	125	797	922	250	315	80	160	120	400	315	18	266	130

	Type	E-Motor																					
Nr.	1450 min-1	kW	A	DN1	C1	B1	n	DN2	C2	B2	n	a	f	f1	h1	h2	b	m1	m2	n1	n2	s	l	x
26	100/200-3/4	3	7,3	125	250	210	8	100	200	180	8	125	535	660	200	280	80	160	120	360	280	18	154	100
26	100/200-4,0/4	4	9,3	125	250	210	8	100	200	180	8	125	556	681	200	280	80	160	120	360	280	18	166	100
26	100/200-5,5/4	5,5	12	125	250	210	8	100	200	180	8	125	605	730	200	280	80	160	120	360	280	18	205	100
27	100/250-7,5/4	7,5	16	125	250	210	8	100	200	180	8	125	645	770	225	280	80	160	120	400	315	18	205	100
27	100/250-11/4	11	23	125	250	210	8	100	200	180	8	125	797	922	225	280	80	160	120	400	315	18	266	130
28	100/315-15/4	15	31	125	250	210	8	100	200	180	8	125	797	922	250	315	80	160	120	400	315	18	266	130
28	100/315-22/4	22	43	125	250	210	8	100	200	180	8	125	863	988	250	315	80	160	120	400	315	18	274	130
31	125/250-11/4	11	23	150	285	240	8	125	250	210	8	140	797	937	250	355	80	160	120	400	315	18	266	130
31	125/250-15/4	15	31	150	285	240	8	125	250	210	8	140	797	937	250	355	80	160	120	400	315	18	266	130
32	125/315-22/4	22	43	150	285	240	8	125	250	210	8	140	863	1003	280	355	100	200	150	500	400	22	274	130
32	125/315-30/4	30	58	150	285	240	8	125	250	210	8	140	958	1098	280	355	100	200	150	500	400	22	340	130
34	150/250-11/4	11	23	200	340	295	12	150	285	240	8	140	797	957	280	375	100	200	150	500	400	22	266	130
34	150/250-15/4	15	31	200	340	295	12	150	285	240	8	140	797	957	280	375	100	200	150	500	400	22	266	130
35	150/315-22/4	22	43	200	340	295	12	150	285	240	8	160	863	1023	315	400	100	200	150	550	450	22	274	130
35	150/315-30/4	30	58	200	340	295	12	150	285	240	8	160	958	1118	315	400	100	200	150	550	450	22	340	130
38	200/315-30/4	30	58	250	405	355	12	200	340	295	12	180	958	1228	355	450	100	150	200	550	450	22	340	130
38	200/315-45/4	45	85	250	405	355	12	200	340	295	12	180	1066	1336	355	450	100	150	200	550	450	22	340	180

9. CE-KONFORMITÄTSERKLÄRUNG

(Gem. Richtlinie 2006/42/EC)

Hiermit erklären wir, dass die in dieser Betriebsanleitung beschriebenen

Spiralgehäusepumpen in Blockbauweise der Serie **NCB**

mit Fabrikationsnummer nach Leistungsschild den EG- Vorschriften 2004/108/EG, 2006/42/EG, 2006/95/EG entsprechen.

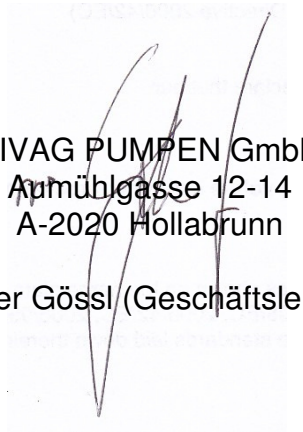
CONFORMITY DECLARATION OF MACHINERY

(Directive 2006/42/EC)

We SIVAG Pumpen Ges.m.b.H. declare that our

Volute casing pumps in bloc design range **NCB**,

with pump type and serial number as shown on the name plate, are constructed in accordance with Directives 2004/108/EC, 2006/42/EC, 2006/95/EC and assume full responsibility for conformity with the standards laid down therein.



SIVAG PUMPEN GmbH
Aumühlgasse 12-14
A-2020 Hollabrunn

Werner Gössl (Geschäftsleitung)

NOTES:

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NOTES:

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