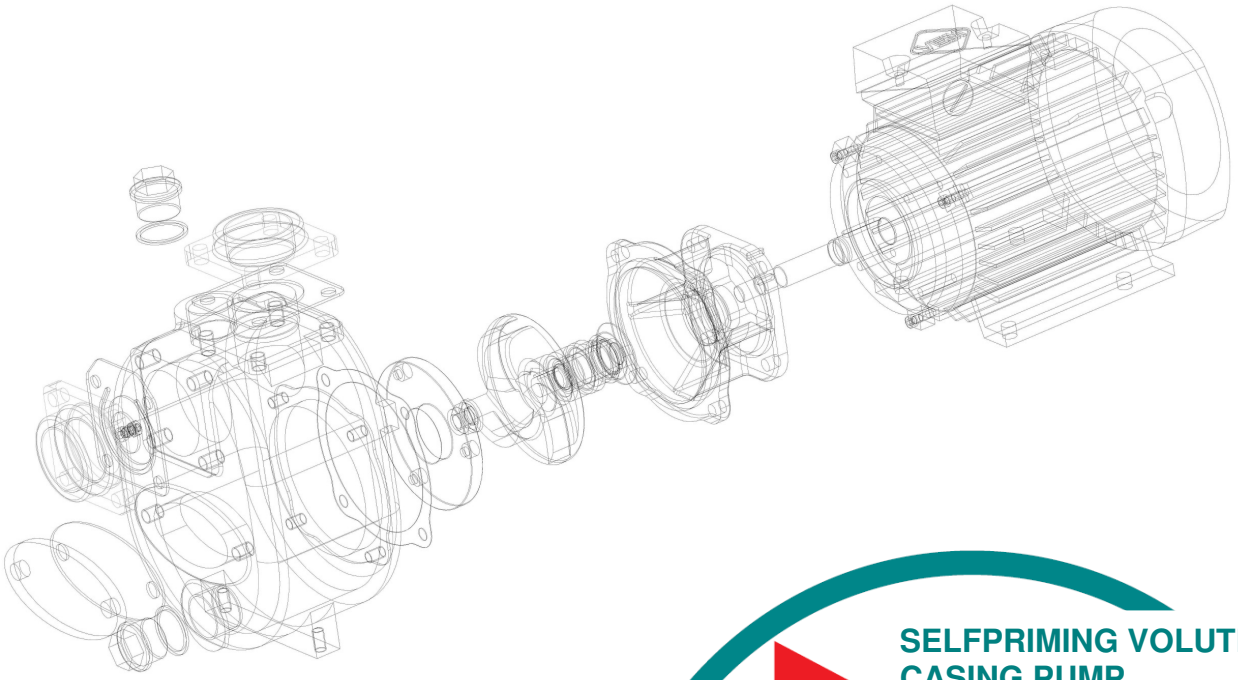
SIVAG
PUMPEN AUSTRIA

Maintenance- and Service Manual



SELFPRIMING VOLUTE
CASING PUMP
S

CONTENTS

1 DESCRIPTION

1.1 General description

S- Pumps are horizontal one – stage selfpriming - centrifugal pumps with open impeller handling fluids with solids up to 80mm. The special design makes
S - series a quick selfpriming pump. Footvalves are not necessary. The pump self-primes automatically to depths of 7.5 m. Liquids with sand, mud and any abrasives can be pumped. I dependence on the materials acids and alkalis can be pumped.

1.2 Design

S pumps are executed either as block pumps with an electric-, petrol- or diesel engine or with a bare shaft. Bare shaft pumps with bearing brackets are generally suited with a coupling to an electric engine on a base plate. All pumps are equipped with external lubricated mechanical seals. The lubrication with oil or grease prevents temporary seal-damages while dry running and stops leaking of air or liquid along the shaft. S – pumps do generally have a non return valve on the suction side. Suction and delivery ports have generally female thread, but DIN flanges are also available.

1.3 guarantee

The supplier guarantees for the pump materials a year until the date of delivery. Wear parts and careless damage are not included.
In case the customer opens the pump, the supplier loses his liability of guarantee. Costs of transport are beard by the customer.
In case of any changes of the above mentioned points, a separate agreement is needed.

2 SAFETY

A pump that is installed incorrectly, operated wrongly, or maintained poorly can present a hazard. If the following considerations are overlooked, the safety of personnel or satisfactory operation of the pump may be endangered.

Attention must be given to the safe handling of all items. Where pumps, pump units or components weigh in excess of 20 kg, it is recommended that soutable lifting equipment should be used in the correct manner to ensure that personal injury or damage to pump components does not occur.
NOTE that lifting eyes fitted to individual pieces such as pump and motor are designed to lift only this part and not the complete assembly.

Before starting to dismantle a pump all relevant and appropriate safety precautions must be taken, particularly if the pumps have been handling hazardous or toxic products. Seek advice from your safety officer or the manufacturer if you have any doubts.

Always wear adequate protective clothing and eye protection when dismantling pums that have been used to pump toxic or hazardous products. Breathing apparatus may be necessary.

Always isolate the pump electrically before dismantling. Ensure that the electrical switch gear cannot be operated whilst any work is being carried out on the pump.

Always drain the pump casing of product before removing the pump from its associated pipework.

Flush out the pump casing and shroud with a compatible flush and drain away to a safe area.

Check with your process people to see if any special decontamination procedures have to be followed before working on a pump.

All pumps returned for factory servicing must be decontaminated and labeled to inform what precautions should be taken before dismantling.

3 SHIPMENT INSPECTION

Pumps and units are shipped suitably protected to prevent damage in transit from normal handling. When received, the shipment should be inspected immediately. Damages to the packaging or crating that may reveal content damages when unpacked should be noted on the carrier's bill of lading.
A photograph is helpful in any claims to be made against the shipper; also, inform manufacturer or the local authorized distributor.

Shipment shortages, checked against the bill of lading, should be reported to the carrier and likewise noted on the bill of lading.

Check the nameplate data against the shipping papers and against your purchase order to ensure that the proper pump is provided.

4 STORAGE AND TRANSPORT

please ensure for long term storage that:
- vibration-free place of storage to spare the bearings.
- the ports are closed
- that is complete emptied or filled with antifreeze agent.
- the cast iron pumps should be rust protected especially between impeller and casing.
- protect the engine against moist and dust.

For transportation are the same points valid as for storage.
Take care of the engine fan cover and switchbox.

Never lift the pump on the shaft.

5 PUMP ASSEMBLING

5.1 Pump disassembling

- loosen the casing screws and remove the casing.
- loosen the impellernut and remove the impeller from 2 sides.
- loosen the lantern screws and remove the lantern from the engine.

5.2 Mechanical seal disassembly

- remove the rotary part of the mechanical seal after you removed the casing, impeller and the distance plate.
- remove the stationary part and the shaft sleeve.

5.3 Mechanical seal assembling

Follow the disassembling instruction in reverse sequence.
Take care, that the seal faces are clean, in good shape and slightly oily.

5.4 pump assembling

Follow the disassembling instruction in reverse sequence.
Take care, that the seal faces are clean, in good shape and slightly oily.

5.5 starting

- fill up the casing with liquid
- control the oil or grease level of the mechanical seal lubrication
- control the sense of rotation.
- control motor voltage and frequency of the engine and compare it with the mains voltage and frequency.

5.6 Pump maintenance:

- lubrication control: oil-lubrication once a week
  grease-permapatron twice a year

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6 INSTALLATION

6.1 positioning

The aggregate should be positioned in a way that it´s easy to maintenance and inspect it afterward.
The pipes around the pump should allow to disconnect and lift the pump.

6.2 Foundation

The foundation has to be solid and being able to bear the vibration of pumps and pipes.

6.3 Piping

The suction pipes should be as short as they can be and continuously rise to the pump. The diameter of the suction pipe has to be equal or wider then the suction port diameter. The flow speed should exceed 2 m/s. I case that one suction pipe is used for several pumps the pipe branching has to avoid vorticities. T connections are prohibited and should be replaced with a diagonal mouth shown in picture 3. Pipereducings should be level on upper side. Valves are only used to close the suction pipe if necessary (positive suction head).
The delivery pipe should be fitted with a valve in any way, or make it easy replaceable. If the suction pipe is temporary closed we recommend to install a bypass to reduce the pressure and prevent overheating.

7 FAULT FINDING

before you begin the fault finding we request you to ensure that the pump has the right sense of rotation.
proof the delivery and suction pressure and eventual the flow and energy demand.

7.1 less capacity

- wrong sense of rotation
- Pump sucks air:
- suction pipe leaks air
- pump sucks air trough the mechanical seal (change the sealing , or proof the suction head)
- wrong piping - narrow suction diameter and length causes cavitations.
- hot liquids cause cavitations in case of extremely suction heads
- wide seal – slit between Impeller and wearplate (control and change the worn parts in case)
- Impeller, Pipes or strainer is overgrown or clogged.

7.2 shaft seal is leaking

All S - pumps have mechanical seals as a standard.
- vibrations
- wrong mounted; stationary part fits in the casing! – seal assembly is not completed /distance rings
- sealing blocks because auf mud
- O- rings are worn; a chemical reaction might could be the reason
- the sealing itself is worn

7.3 Hot Bearings

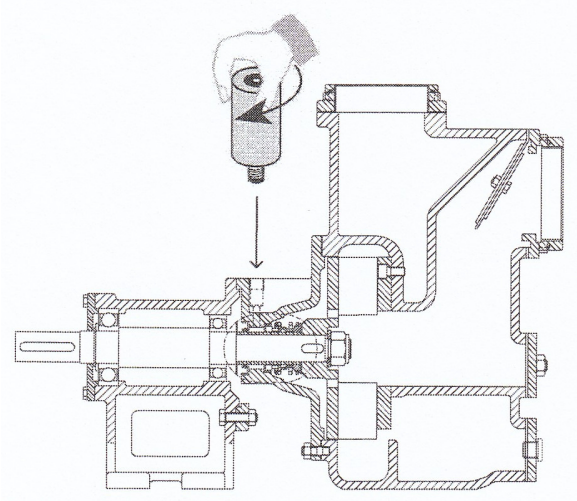
- wrong or no lubrication
- oil or grease is old and dirt contaminated.
- the bearings are worn or squeezing.

7.4 Vibrations

- cavitations check 3.5, 4.1 and 4.2 again
- strong throttled pump
- foreign elements are in the pump
- loose foundation

8 INSTRUCTIONS FOR AUTOMATIC LUBRICATOR

8.1 Specification



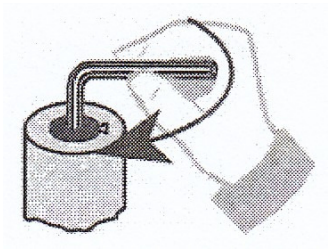
The automatic lubricator (+P) is a long-term grease dispenser activated by a hydrogen gas producing drycell. The lubricator contains 125 ml of grease dispensed during a period of 12 months.

Weight: full: app. 190 g
empty: app. 75 g
Operating temperature: min. -20°C
max. +55°C

8.2 Installing and activation

Open the lubricator outlet by removing the plug.
Attention: *If the lubricator is started without opening the outlet the pressure in the lubricator can be built up. At an overpressure of app. 5 bar the lubricator bursts on the defined breaking point between housing and bottom.*

Screw the lubricator in the hole with ¼" thread on the head of the pump. If the hole is already closed by a tap or grease nipple take this part away. If necessary, use the extension to mount the lubricator.



Set the gas generator to position 12 (12 months) using a size 3 mm Allen key.

With a waterproof pen register the starting date on the label. The life time of the lubricator is 12 months. Replace afterwards the empty lubricator with the same type.

8.3 Notes

Depending on temperature it can take some days after activating, until grease is dispensed for the first time.
The lubricator can be readjusted or switched off (position 0) during operation. If you unscrew the lubricator the created pressure in the Quench camber will be lost and the life time of the lubricator will be less.

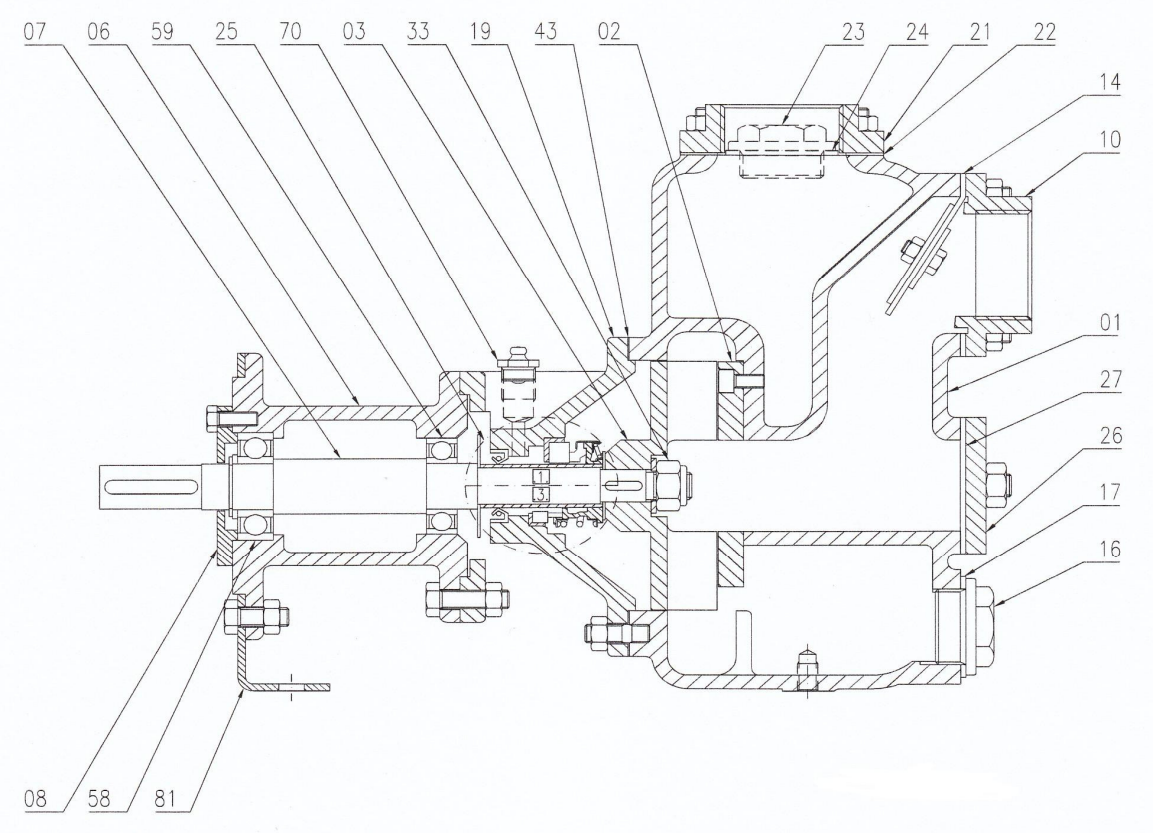
In order for the lubricator to function reliably it is important to have filled grease lines. If you change the mechanical seal it is important to refill the quench camber and the line before installing the lubricator.

8.4 Recycling

Un-screw gas generator from the lubricator and dispose the complete part in the battery recycling.
Attention: Do not un-screw the gas generator from the lubricator near a naked flame.
Dispose of empty housing of the lubricator in the PET-recycling. If the lubricator still contains grease, please dispose ti in accordance with the local regulations.

9 SECTIONAL DRAWING – SPARE PART LIST

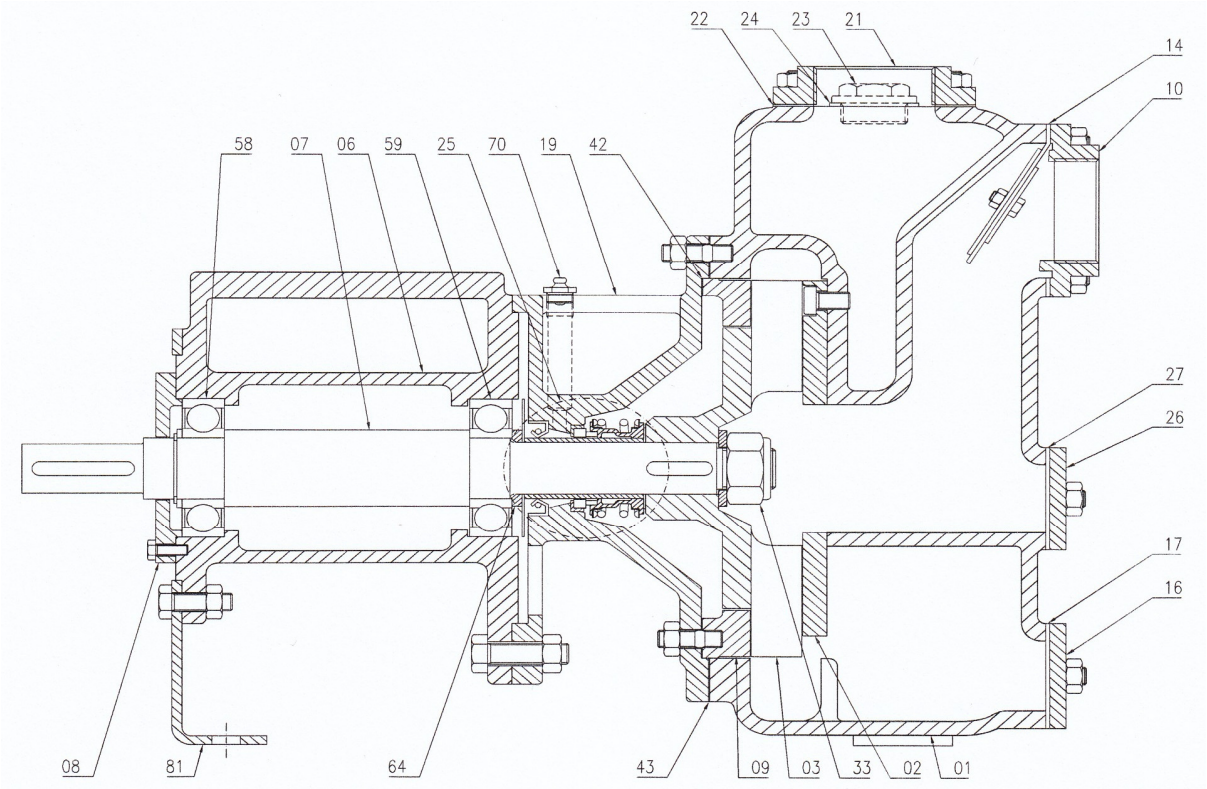
For pumps S 40, 45, 50, 60, 80, 83, 100 G



Pos.	Benennung	Part Name
01	Gehäuse	Casing
02	Verschleißplatte	Wear plate
03	Laufrad	Impeller
06	Lagergehäuse	Bearing House
07	Welle	Shaft
08	Lagerdeckel	Bearing Cover
10	Saugstutzen	Suction Flange
14	Ventilklappe	Check Valve
16	Ablass- Deckel bzw. Schraube	Drain Cover or Plug
17	Dichtung (Ablass)	Gasket (Drain)
19	Zwischenflansch	Head
21	Druckstutzen	Discharge Flange
22	Dichtung, Druckstutzen	Gasket, Discharge Flange
23	Einfüll- Deckel bzw. Schraube	Priming Cover or Plug
24	Dichtung (Einfüll)	Gasket (Priming)
25	Gleitringdichtung	Mechanical Seal
26	Reinigungsdeckel	Clean Out Cover
27	Dichtung (Reinigung)	Gasket (Clean Out)
33	Mutter, Laufrad	Nut, Impeller
43	Dichtung, Gehäuse	Gasket, Casing
58	Kugellager, außen	Ball Bearing, outer
59	Kugellager, innen	Ball Bearing, inner
70	Schmiernippel	Grease Lubricator
81	Lagerfuß	Foot, Bearing House

10 SECTIONAL DRAWING – SPARE PART LIST

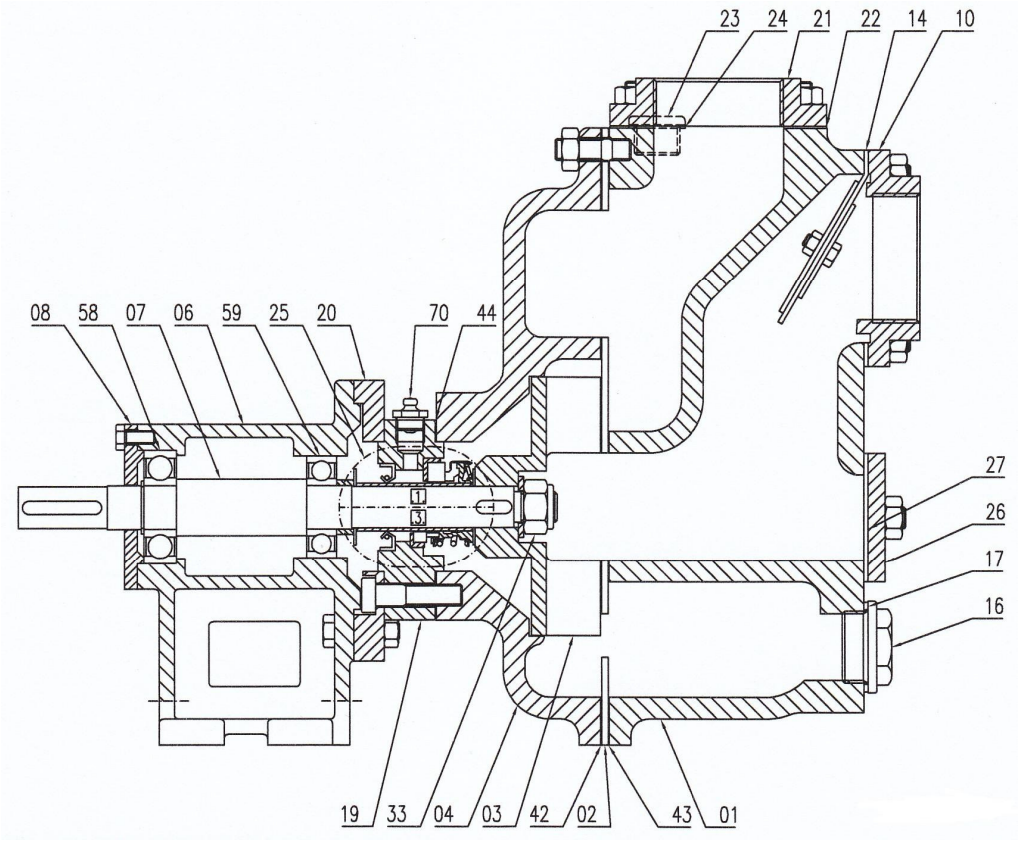
For pumps S 63, 65, 68, 85, 88, 91, 105, 108, 121, 150, 161, 170, 180, 201, 220, 230 G



Pos.	Benennung	Part Name
01	Gehäuse	Casing
02	Verschleißplatte	Wear plate
03	Laufrad	Impeller
06	Lagergehäuse	Bearing House
07	Welle	Shaft
08	Lagerdeckel	Bearing Cover
09	Verschleißplatte, hinten	Rear Wear Plate
10	Saugstutzen	Suction Flange
14	Ventilklappe	Check Valve
16	Ablass- Deckel bzw. Schraube	Drain Cover or Plug
17	Dichtung (Ablass)	Gasket (Drain)
19	Zwischenflansch	Head
21	Druckstutzen	Discharge Flange
22	Dichtung, Druckstutzen	Gasket, Discharge Flange
23	Einfüll- Deckel bzw. Schraube	Priming Cover or Plug
24	Dichtung (Einfüll)	Gasket (Priming)
25	Gleitringdichtung	Mechanical Seal
26	Reinigungsdeckel	Clean Out Cover
27	Dichtung (Reinigung)	Gasket (Clean Out)
33	Mutter, Laufrad	Nut, Impeller
42	Dichtung, Verschleißplatte, hinten	Gasket, Rear Wear Plate
43	Dichtung, Gehäuse	Gasket, Casing
58	Kugellager, außen	Ball Bearing, outer
59	Kugellager, innen	Ball Bearing, inner
70	Schmiernippel	Grease Lubricator
81	Lagerfuß	Foot, Bearing House

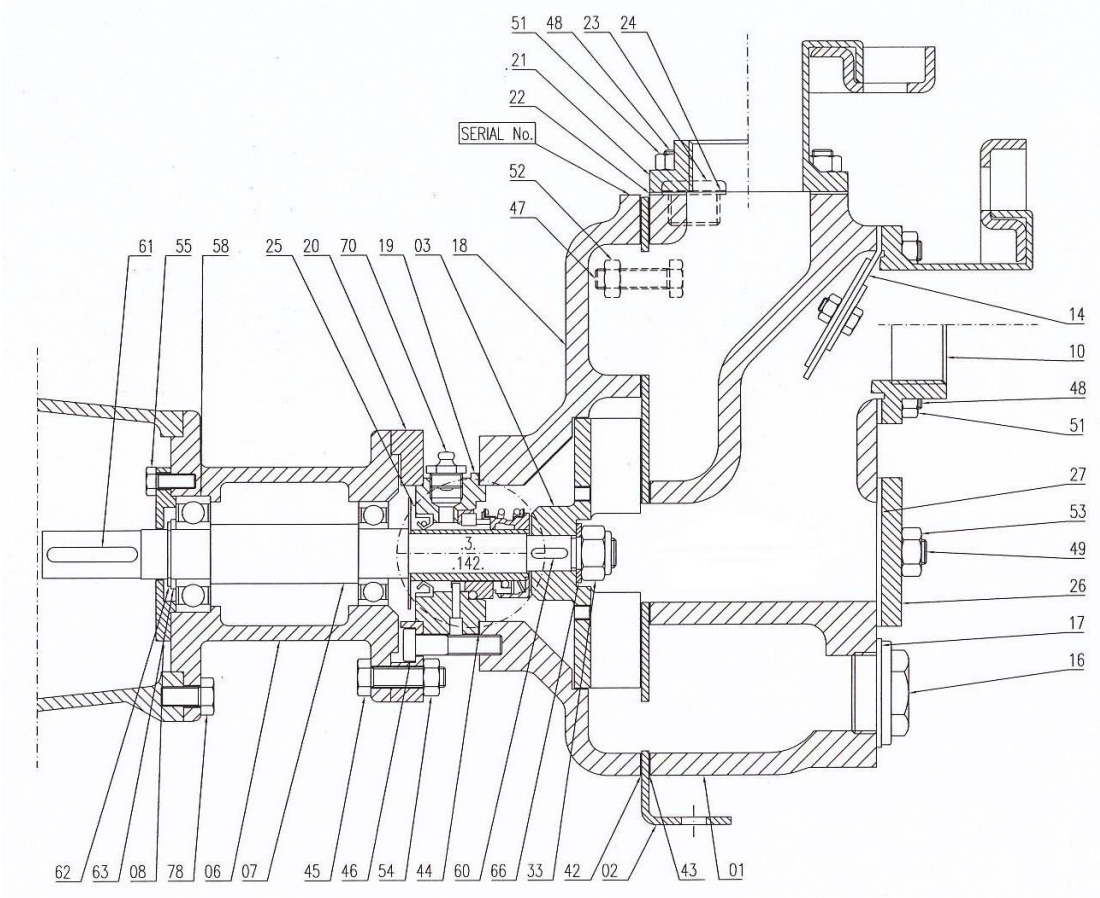
11 SECTIONAL DRAWING – STAINLESS STEEL

For pumps S 41, 46, 51, 61, 80 K



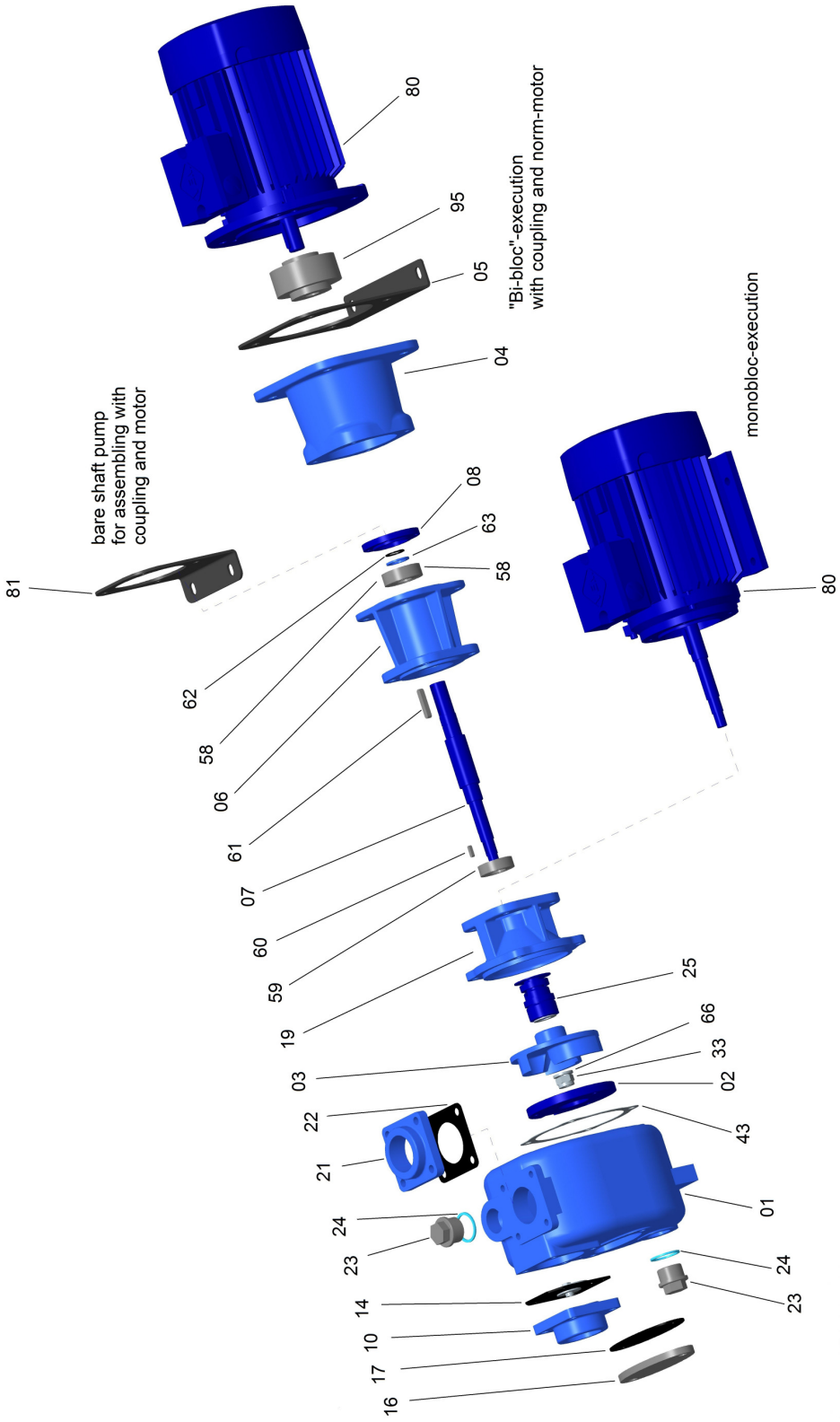
Pos.	Benennung	Part Name
01	Gehäuse	Casing
02	Verschleißplatte	Wear plate
03	Laufrad	Impeller
04	Spiralgehäuse	Volute Casing
06	Lagergehäuse	Bearing House
07	Welle	Shaft
08	Lagerdeckel	Bearing Cover
10	Saugstutzen	Suction Flange
14	Ventilklappe	Check Valve
16	Ablass- Deckel bzw. Schraube	Drain Cover or Plug
17	Dichtung (Ablass)	Gasket (Drain)
19	GLRD-Träger	Seal Box
21	Druckstutzen	Discharge Flange
22	Dichtung, Druckstutzen	Gasket, Discharge Flange
23	Einfüll- Deckel bzw. Schraube	Priming Cover or Plug
24	Dichtung (Einfüll)	Gasket (Priming)
25	Gleitringdichtung	Mechanical Seal
26	Reinigungsdeckel	Clean Out Cover
27	Dichtung (Reinigung)	Gasket (Clean Out)
33	Mutter, Laufrad	Nut, Impeller
42	Dichtung, Verschleißplatte, hinten	Gasket, Rear Wear Plate
43	Dichtung, Gehäuse	Gasket, Casing
44	Dichtung, GLRD-Träger	Gasket, Seal Box
58	Kugellager, außen	Ball Bearing, outer
59	Kugellager, innen	Ball Bearing, inner
70	Schmiernippel	Grease Lubricator

12 SECTIONAL DRAWING Bi-block (BBT)



Pos.	Benennung	Part Name
01	Gehäuse	Casing
02	Verschleißplatte	Wear plate
03	Laufrad	Impeller
10	Saugstutzen	Suction Flange
14	Ventilklappe	Check Valve
16	Ablass- Deckel bzw. Schraube	Priming Cover or Plug
17	Dichtung (Ablass)	Gasket (Priming)
18	Spiralgehäuse	Volute
19	GLRD-Träger	Seal Box
20	Trägerflansch	Seal Box, Flange
21	Druckstutzen	Discharge Flange
22	Dichtung, Druckstutzen	Gasket, Discharge Flange
25	Gleitringdichtung	Mechanical Seal
26	Reinigunsdeckel	Drain Cover or Plug
27	Dichtung (Ablass)	Gasket (Priming)
33	Mutter, Laufrad	Nut, Impeller
42	Dichtung, Gehäuse	Gasket, Casing
44	Dichtung, GLRD-Träger	Gasket, Seal Box
58	Kugellager, außen	Ball bearing, outer
59	Kugellager, innen	Ball bearing, inner
66	Scheibe, Laufrad	Washer, impeller
70	Schmiernippel	Grease Lubricator

13 EXPLOSION VIEW



14. CE-KONFORMITÄTSERKLÄRUNG

(Gem. Richtlinie 2006/42/EC)

Hiermit erklären wir, dass die in dieser Betriebsanleitung beschriebenen

Selbstansaugenden Kreiselpumpen der Serie **S**

in Blockausführung oder mit freiem Wellenende und Fabrikationsnummer nach Leistungsschild den EG- Vorschriften 2004/108/EG, 2006/42/EG, 2006/95/EG entsprechen.

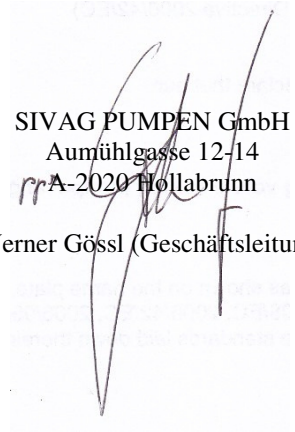
CONFORMITY DECLARATION OF MACHINERY

(Directive 2006/42/EC)

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

selfpriming volute casing pumps range **S**,

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.



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