BE2805 Operating Instructions

(Translation of original)

BRINKMANN Immersion Pumps

SGL331…503

Brinkmann Immersions pumps of the series SGL331 ... 503

Contents

1 Indication to the manual

This operating manual gives basic instructions which are to be observed during installation, operation and maintenance of the pump. It is therefore imperative that this manual be read by the responsible personnel and operator prior to assembly and commissioning. It is always to be kept available at the installation site.

1.1 Identification of safety instructions in the operating manual

Safety instructions given in this manual non-compliance with which would affect **safety** are identified by the following symbol

Safety sign according with ISO 3864 – B.3.1

or where **electrical safety** is involved, with:

Safety sign according with ISO 3864 – B.3.6

Where non-compliance with the safety instructions may cause a risk to the machine and it's function the word

ATTENTION

is inserted.

2 Description of product

2.1 General description of the pump

Pumps of this type are one or multi-stage rotary pumps where the impellers are fixed on the driving shaft extension. The pump shaft and motor shaft are interconnected by means of a shaft clamp. Pump and motor form a compact and space-saving unit. These pumps are fitted out with semi-open impellers and a suction screw.

Vertically mounted pumps are equipped with a mounting flange. The pump end immerses into the tank and the motor extends vertically above the tank.

2.2 Intended use

The immersion pumps of the series SGL are suitable for handling extremely inflated fluids (grinding oils) within the limiting application in accordance with table 1.

Limit of Application (Table 1)

Type	SGL331...333	SGL501...503
Mediums	Coolants, cooling- and cutting-oils, grinding oils	
Kinetic viscosity of the medium	...45 mm^2/s	...45 mm^2/s
Temperature of medium	0 ... 80 °C	0 ... 80 °C
Particle-size in the medium	5 mm SGL331…333 5 mm SGL501…503	
min. delivery volume	1% of Q max.	
Dry running	Dry running causes increased wear and should be avoided. During the test of the direction of rotation (< 30 s) permissible.	
Switching-on frequency per hour	Motors less 3 kW max. 200 from 3 kW to 4.0 kW max. 40	
Ambient temperature	40 °C	
Set-up altitude	1000 m	

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The pumps are to be operated within their design limits. Applications outside of these limits are not approved. The manufacturer is not responsible for any damages resulting from use of the pumps in such applications.

2.3 Technical data

Type	Max. del. pressure bar / spec. weight 1	Max. del. volume l/min	Height[1)] **H** mm	Depth of immersion[1)] **h** mm	Weight **g** kg	Power 50 / 60 Hz kW
SGL331 / 140	0.8	350	334	140	22	0.85 / 0.98
/ 220				220	23	
/ 290				290	24	
/ 370				370	25	
/ 460				460	27	
/ 570				570	28	
/ 770				770	35	
/ 920				920	37	
SGL332 / 190	2.0	370	406	190	34	1.7 / 1.95
/ 270				270	35	
/ 340				340	36	
/ 420				420	37	
/ 510				510	38	
/ 620				620	40	
/ 820				820	47	
/ 970				970	49	
SGL333 / 240	3.2	380	439	240	40	2.2 / 2.55
/ 320				320	41	
/ 390				390	42	
/ 470				470	43	
/ 560				560	45	
/ 670				670	47	
/ 870				870	53	
/1020				1020	55	
SGL501 / 150	1.0	420	361	150	23.5	1.1 / 1.27
/ 230				230	24.5	
/ 300				300	25.5	
/ 380				380	27.0	
/ 470				470	28.0	
/ 580				580	30.0	
/ 780				780	36.0	
/ 930				930	38.0	
SGL502 / 220	2.5	450	439	215	40	2.2 / 2.55
/ 300				295	41	
/ 370				365	42	
/ 450				445	43	
/ 540				535	45	
/ 650				645	47	
/ 850				845	54	
/1000				995	55	
SGL503 / 280	3.9	460	478	280	54	3.3 / 3.8
/ 360				360	55	
/ 430				430	56	
/ 510				510	57	
/ 600				600	59	
/ 710				710	61	
/ 910				910	67	
/1060				1060	69	

1) Dimensions in accordance with page 5

The motor is surface-cooled and compliant with
DIN IEC 34 and EN 60034 (protection degree IP 55).

3 Safety instructions

When operating the pump, the safety instructions contained in this manual, the relevant national accident prevention regulations and any other service and safety instructions issued by the plant operator are to be observed.

3.1 Hazards in the event of non-compliance with the safety instructions

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the machine and results in a loss of any right to claim damages.
For example, non-compliance may involve the following hazards:

- Failure of important functions of the machines/plant
- Failure of specified procedures of maintenance and repair
- Exposure of people to electrical, mechanical and chemical hazards
- Endangering the environment due to hazardous substances being released

3.2 Unauthorized modes of operation

- Pump may not be used in potentially explosive environments**!**
- Pump and discharge piping are not designed to hold any weight and may not be used as a step ladder.

3.3 Remaining Risk

Risk of Injury!
Risk of squeezing or crushing body parts when installing or removing the pump exists. Proper and secured lifting tools must be used.

Risk of burns!
The pump must have cooled down sufficiently prior to commencing any repair, maintenance or installation.

3.4 Qualification and training of operating personnel

The personnel responsible for operation, maintenance, inspection and assembly must be adequately qualified. Scope of responsibility and supervision of the personnel must be exactly defined by the plant operator. If the staff does not have the necessary knowledge, they must be trained and instructed, which may be performed by the machine manufacturer or supplier on behalf of the plant operator. Moreover, the plant operator is to make sure that the contents of the operating manual are fully understood by the personnel.

3.5 Safety instructions relevant for operation

- If hot or cold machine components involve hazards, they must be guarded against accidental contact.
- Guards for moving parts (e.g. coupling) must not be removed from the machine while in operation.
- Any leakage of hazardous (e.g. explosive, toxic, hot) fluids (e.g. from the shaft seal) must be drained away so as to prevent any risk to persons or the environment. Statutory regulations are to be complied with.
- Hazards resulting from electricity are to be prevented (see for example, the VDE Specifications and the bye-laws of the local power supply utilities).
- The pumps' stability against falling over is not ensured unless it is properly mounted onto the tank.
- The female threads on the motor MUST NOT be used to lift the entire pump and motor assembly.

3.6 Safety instructions relevant for maintenance, inspection and assembly work

Any work on the machine shall only be performed when it is at a standstill, it being imperative that the procedure for shutting down the machine described in this manual be followed.
Pumps and pump units which convey hazardous media must be decontaminated.
On completion of work all safety and protective facilities must be re-installed and made operative again.
Prior to restarting the machine, the instructions listed under "Start up" are to be observed.

3.7 Signs on the pump

It is imperative that signs affixed to the machine, e.g.:

- arrow indicating the direction of rotation
- symbols indicating fluid connections

be observed and kept legible.

3.8 Unauthorized alterations and production of spare parts

Any modification may be made to the machine only after consultation with the manufacturer. Using spare parts and accessories authorized by the manufacturer is in the interest of safety. Use of other parts may exempt the manufacturer from any liability.

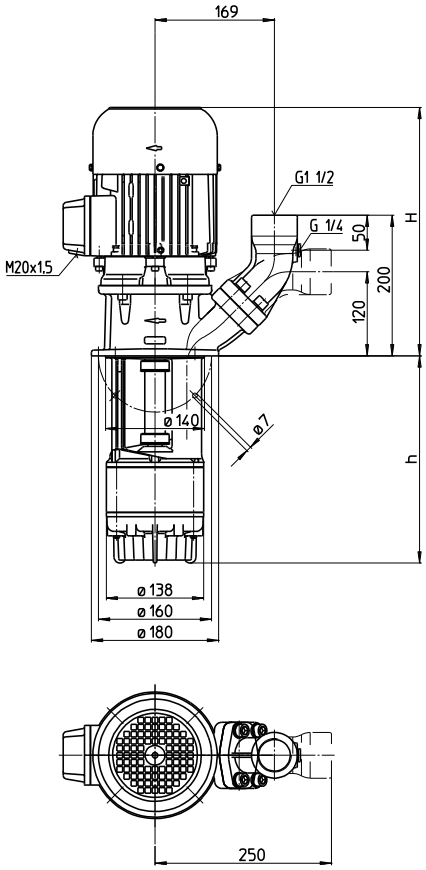
4 Transport and storage

Protect the pump against damage when transporting.
The pumps may only be transported in a horizontal position and hooks or straps must be attached on the motor and pump end.
Do not use the pump shaft for connecting any transportation aids such as hooks or straps.
Pumps must be drained prior to their storage.
Store pump in dry and protected areas and protect it against penetration of foreign bodies.
Always store pump above the freezing point!

5 Installation and Connection

5.1 Mechanical installation

During any assembly or disassembly process the pumps must be secured against tipping trough ropes for example at all times.
Pumps must be mounted securely. Piping, tank and pumps must be mounted without any tension.
The inlet is at the bottom of the immersed pump body. The distance between the inlet and the tank bottom must be so large that the inlet can not be blocked by deposits during longer shutdowns.
To obtain the full flow rate it is recommended to choose for the pipework the nominal bore diameter of the pumps cross section for connection. Therefore pipe bends should be used, not pipe angles!
The pipework must be qualified for occuring hydraulic pressure.



ATTENTION

Maximum tightening torque for piping connections is 150 Nm!

When installed the space around the pump must be large enough to provide sufficient cooling of the motor.

Do not prop up the pressure line via the joining socket.

The pump must be mounted in that way that rotating parts under the cover of the coolant tank can not be touched!

5.2 Electric wiring

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board!

According to the European Standard EN809 a motor overload must be installed and properly set to the full load amps stated on the pump name plate.

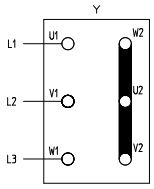
It is the responsibility of the machine operator to decide whether or not an additional emergency switch must be installed.

5.2.1 Circuit

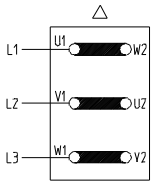
Tension voltage and frequency must correspond with the shown specification on the nameplate.
The pump must be wired so that a solid longterm electrical connection is ensured. Establish a solid ground connection.

The electrical wiring must be performed according to the wiring diagram shown inside the terminal box cover. (Please see above sample wiring diagrams)

Wiring diagram e.g.



Star connection
3 x 400 V, 50 Hz
resp. 380-415 V, 50 Hz



Delta connection
3 x 230 V, 50 Hz
resp. 220-240 V, 50 Hz

There may be no foreign objects such as dirt, particles or humidity inside the terminal board.

Mount terminal board cover to motor tight against dust and humidity and close up all unused wiring ports.

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When Variable Frequency Drives are used interfering signals might occur.
Non-sinus shaped supply voltage from a variable frequency drive might result in elevated motor temperatures.

6 Start up / Shut down

6.1 Start up

ATTENTION

Switch off at the mains.
After connection the electrical wires, close the terminal box. Briefly start the motor (max. 30 sec.) and check the rotation according to the arrow on the top of the motor.
If the direction is incorrect change over two of the power leads.

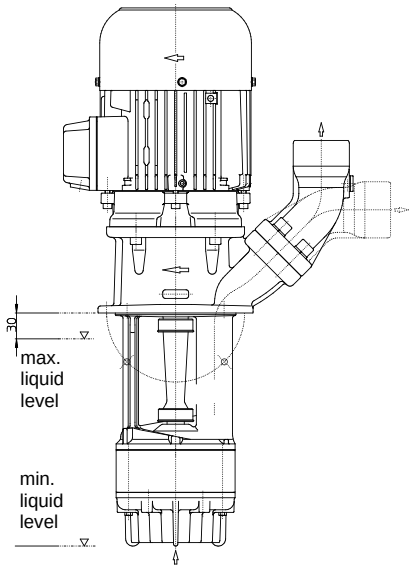
6.2 Shut down

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board! Open terminal box and disconnect the power leads. Empty out the pump.

7 Operation

Liquid level

According to the drawing shown below, the maximum liquid level must stay about 30 mm below the mounting flange, also ensure that the suction hole of the pump body must be covered with liquid before starting up the motor.



If the pump should lock up and cease, shut pump down (see 6.2) and disconnect from power supply. Pump must be uninstalled and removed from the system prior to its repair.

8 Servicing and Maintenance

ATTENTION

The surface of the motor must be kept free of dirt.

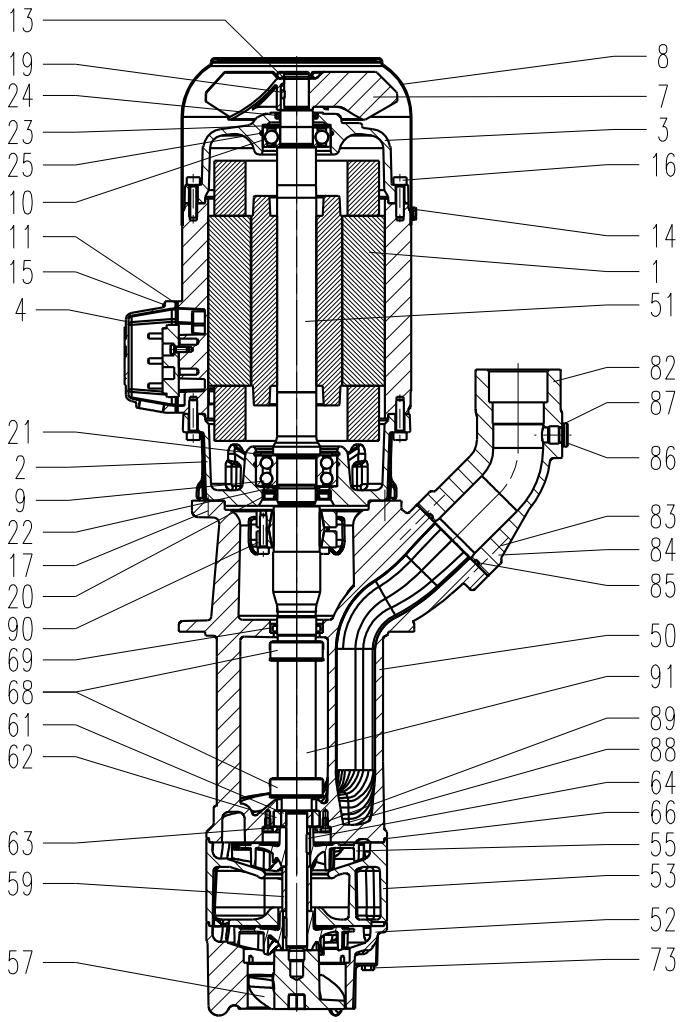
The motor shaft is spinning in permanently greased ball bearings (with special grease and increased bearing play) and does not require any special maintenance.

9 Trouble shooter's guide

Fault	Cause	Remedy
Motor does not start, no motor noise	At least two of the power supply leads have failed Overload has tripped	Check fuses, terminals and supply leads . Inspect overload
Motor does not start, humming noise	One of the supply leads has failed Impeller faulty Motor bearing faulty	See above Replace impeller Replace bearing
Overload trips	Pump locked up mechanically High on/of cycling frequency	Inspect pump hydraulics Check application
Power consumption is too high	Wrong direction of rotation of impeller Lime or other deposits mechanical friction	See above Clean pump mechanism repair pump
Motor overheats	High on/off cycling frequency Wrong power supply (voltage or cycles) Insufficient cooling	See above Power supply must correspond with name plate rating Check air flow at motor fan
Pump does not pump	liquid level too low Pump mechanism faulty Pipe blocked	Fill up liquid replace pump mechanism Clean pipe
Insufficient flow and pressure	Wrong direction of rotation of impeller Pump mechanism silted up Worn pump mechanism	Change over two power supply leads Clean pump mechanism Replace pump mechanism
Incorrect flow or pressure	Wrong power supply (voltage or cycles)	Power supply must correspond with name plate rating
Running noise/Vibration	Foreign objects in pump end Impeller damaged Bearing/Bushing broken	Remove foreign objects Replace impeller Replace bearing/bushing

10 Spare part

10.1 Spare part list for the immersion pumps of the series SGL331 ... 503



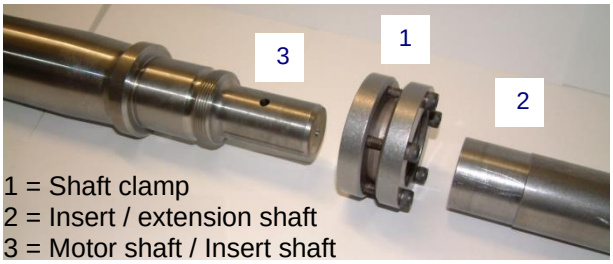
Item	Description	
1	Stator with terminal board	
2	Motor flange	
3	End shield	
4	Terminal box	
7	Fan	
8	Fan cover	
9	Ball bearing	DIN 625
9	Ball bearing 1.3…2.2 kW	DIN 628
10	Ball bearing	DIN 625
11	Gasket	
13	Retaining ring	
13	Retaining ring 1.3…2.2 kW	DIN 471
14	Thread rolling screw up 1.3 kW	DIN 7500
15	Slotted cheese head screw	DIN 84
16	Stud bolt with bond up to 1.1 kW	
16	Socket head cap screw up 1.3 kW	DIN 912
17	Socket head cap screw	DIN 912
19	Parallel pin	DIN 7
20	Shaft seal	
21	Retaining ring	DIN 472
22	Retaining ring	DIN 471
23	Compensation disk up 1.3 kW	
24	Shaft seal	
25	O-ring up 1.3 kW	
50	Pump body	
51	Shaft with rotor	
52	Intake cover	
53	Pump plate up SGL332, 502	
55	Impeller	
57	Suction screw	
58	Extension pump body up 770 mm depth of immersion	
59	Distance liner	
61	Running sleeve	
62	Bearing bush	
63	Distance plate	
64	Woodruff key	DIN 6888
66	O-ring up 770 mm depth of immersion	
67	O-ring	
68	Splash ring	
69	Shaft seal	
73	Hexagon head cap screw	DIN 931
78	Socket head cap screw up 770 mm depth of immersion	DIN 912
82	Joining socket	
83	Socket head cap screw	DIN 912
84	Spring washer	DIN 7980
85	O-ring	
86	Screw plug	DIN 908
87	Sealing ring	DIN 7603
88	Serrated lock washer	
89	Flat head screw	DIN 7991
90	Shaft clamp 2 x up 770 mm depth of immersion	
91	Insert shaft	
92	Extension shaft up 770 mm depth of immersion	

10.2 Indications to the spare part order

Spare parts are available from the supplier.
Standard commercially available parts are to be purchased in accordance with the model type.
The ordering of spare parts should contain the following details:

1. **Pumptype**
   e.g. SGL332 / 340
2. **Pump No.**
   e.g. 0120232805
   The date of the construction year is a component of the pumps type number.
3. **Voltage, Frequency and Power**
   Take item 1, 2 and 3 from the nameplate
4. **Spare part with item No.**
   e.g. Intake cover item No. 52

11 Repair Instructions / Replacing shaft clamps and shafts



1 = Shaft clamp
2 = Insert / extension shaft
3 = Motor shaft / Insert shaft

11.1 Dismantling the insert shaft or extension shaft

– Disconnect the submergible pump from the mains both electrically and mechanically.
– Remove pump from system. Secure pump against tipping over, i.e. use ropes to secure pump.
– Set the pump down on the fan cover. Dismantle the pump unit and the extension pump body (if appropriate).

Wear safety gloves!
Risk of injury due to sharp edges on pump components, i.e. impeller blades.

– Loosen the screws on the shaft clamp (1) one after the other.

Do not, under any circumstances, remove the screws completely, **danger of injury!**

– Remove the extension shaft (2) and shaft clamp (1).
– Dismantle the pump body.
– Loosen the screws on the shaft clamp (1) (see above), pull the insert shaft (2) off the motor shaft (3).

11.2 Assembling the insert shaft and motor shaft

ATTENTION

Clean the contact surfaces of the insert shaft (2) (inside) and the motor shaft (3). They must not be lubricated or oiled.

– Set the motor down on the fan cover.
– Position the shaft clamp (1) (use a new shaft clamp) in the centre of the cranked clamping diameter (2) of the insert shaft.
– Insert the motor shaft (3) into the insert shaft (2).
– **Tighten**:
  Mark the first screw and tighten all the screws evenly by hand, one after the other in a clockwise direction (not cross-ways).

- Tighten the shaft clamp (∅ 24 mm) for SGL331, 501
  Use a torque screwdriver to tighten each screw first with 1.3 Nm then with 2.6 Nm and finally with 4 Nm (in a clockwise direction again).
- Tighten the shaft clamp (∅ 35 mm) for SGL332…503
  Use a torque screwdriver to tighten each screw first with 2 Nm then with 3.5 Nm and finally with 5 Nm (in a clockwise direction again).
  Repeat the last turn (with 5 Nm) 3 times.
- Mount the pump body.
- In the case of pumps with an extension body, the assembly and tightening of the second shaft clamp (∅ 24 mm) is carried out as before.

The remainder of the reassembly process is to be completed in the opposite order of the prior described dismantling process.

ATTENTION

Note torques for the screw connections!

When putting the pump back into use, **make sure the direction of rotation is correct!**

Tightening torques for screwed connections

Thread - ∅	**M5**	**M6**	**M8**	**M12**
Strength classes	4.8	8.8	8.8	
Tightening torque (Nm)	**4,5** Nm	**4,5** Nm	**20** Nm Item. 78 **4,5** Nm Item 3	**30** Nm Item. 83

12 Disposal

When disposing of the pump or the packaging materials the local and national regulation for proper disposal must be complied with.
Prior to its disposal, the pump must be completely drained and decontaminated if necessary.