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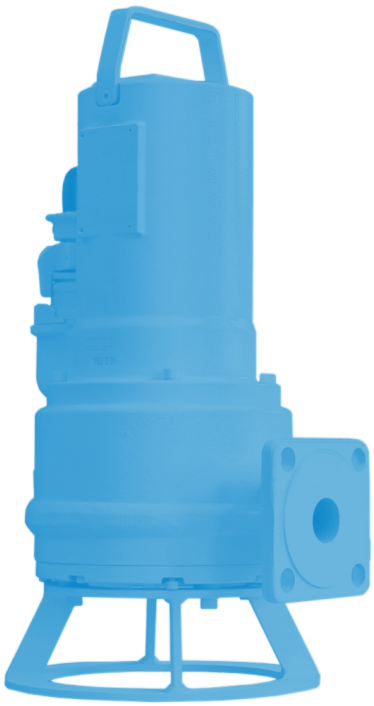
SANIPUMP® ZFS 71



Grinder pump
Operation manual

CONTENTS

1. SAFETY

WARNING
This device can be used by children who are at least 8 years old and by people with reduced physical, sensory or mental capacities or those without knowledge or experience, if they are properly supervised or if they have been given instructions on safely using the device and the associated risks have been understood. Children should not play with the device. Children should not clean or perform maintenance on the device without supervision.

ELECTRICAL CONNECTIONS:

The electrical installation must be done by a qualified electrical engineer.
The device's power supply must be connected to ground (class I) and protected by a high sensitivity differential circuit breaker (30 mA). Devices without plugs must be connected to a main switch on the power supply which disconnects all poles (contact separation distance of at least 3 mm). The connection must be used exclusively to provide the power to the product.
If the power cord is damaged, to prevent possible danger, it must be replaced by the manufacturer, customer service team or a similarly qualified individual.

The operation manual at hand provides basic notes which have to be taken into account during assembly, opera-tion and maintenance works. Therefore, before assembly and commissioning, this operation manual has to be read by the assembler as well as the responsible personnel/operator at all costs. It always has to be available on site of operation of the machine/plant.

The general safety notes listed under the main point safety are not the only notes to be taken into account. Please also observe the specific safety instructions, such as those for private use, listed under other main points.

1.1 Identifying the warning signs

DANGER	**Danger** This term defines a high risk of danger, which can lead to death or serious injury, if not avoided.
	**Dangerous area** This symbol characterises hazards that could lead to death or injury.
	**Dangerous voltage** This symbol characterises dangers associated with the voltage and provides information on voltage protection.
ATTENTION 	**Property damage** This symbol, in combination with the keyword **ATTENTION**, characterises dangers to the machine and its proper operation.

It is imperative to observe signs that are attached directly to the machine (for example, rotational direction arrow, sign for fluid connections) and must be kept fully legible.

1.2 Personnel qualifications and training

The personnel responsible for operation, maintenance, inspection and assembly have to have the corresponding qualifications for those types of work. Area of responsibility, competence and the surveillance of the personnel have to be regulated precisely by the operator. If the personnel do not possess the necessary knowledge, they have to be trained and instructed. By order of the operator, the instruction and training, if necessary, can be carried out by the manufacturer/supplier. Furthermore the operator has to make sure that the personnel have completely understood the content of the operation manual.

1.3 Dangers from non-observance of the safety instructions

Non-observance of the safety instructions can result in danger to persons and damage to the environment and the machine. Non-observance of the safety instructions can lead to loss of any claims for damage compensation.

In detail, non-observance can for instance involve the following hazards :

- Failure of important machine/system functions
- Failure of prescribed methods for maintenance and repairs
- Danger to persons through electrical, mechanical and chemical hazards
- Danger to the environment through leakage of harmful substances

1.4 Safety-awareness at work

The safety instructions described in this Operating Manual, the valid national regulations on accident prevention, and possible internal regulations of the customer on work, operation and safety are to be observed.

1.5 Safety instructions for the customer/operator

- Hot or cold machine components which could cause danger have to be secured against contact by the customer.
- Protective devices to prevent touching moving machinery (e.g. coupling) may not be removed from operating machines.
- Leakage (e.g. shaft seals) of dangerous conveyed products (e.g. explosive, poisonous, hot) has to be led off in such a way that there is no endangerment to persons or environment. Legal stipulations are to be maintained.
- Hazards through electric energy are to be eradicated (for details, see national regulations and those of the local power supply companies).

1.6 Safety instructions for maintenance, inspection and assembly work

The customer has to ensure that all maintenance, inspection and assembly work is carried out by authorised and qualified specialist personnel, who have been sufficiently informed through relevant and adequate study of the Operating Manual.
Work on the machine is to be done on principle only when it is shut down. The procedure for shutting down the machine is described in the Operating Manual and is to be precisely adhered to.

Pumps, or pump units that convey hazardous media have to be decontaminated. Immediately after finishing work, all safety and protective devices have to be re-attached and put into effect.

Prior to initial (re-)start-up, you are to take heed of the points listed in the section Initial Operation.

1.7 Unauthorised re-equipping and spare-part production

Re-equipment and modification of the machine are only permitted after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer are all part of the safety strategy. Use of other parts can eliminate liability for the consequences that ensue.

1.8 Unauthorised modes of operation

Operational safety of the delivered machine is only guaranteed when it is used appropriately according to Section *2 - General* in the Operating Manual. The limit values specified in the data sheet may on no account be exceeded.

2. GENERAL

2.1 Scope

This operation manual is valid for the submersible waste water pumps SANIPUMP® ZFS 71.

If the instructions of the operation manual – especially the safety instructions - are not observed, or in case of unauthorized modifications of the plant or the installation of non-original spare parts, the guarantee expires automatically. The manufacturer assumes no liability for damages resulting from such behaviour!

Manufactured sizes :

SANIPUMP® ZFS 71.1 S	SANIPUMP® ZFS 71.3 T
SANIPUMP® ZFS 71.1 T	SANIPUMP® ZFS 71.4 T
SANIPUMP® ZFS 71.2 T	

2.2 Queries and orders

Please send your queries and orders to your specialist dealer.

2.3 Technical data

SANIPUMP®	ZFS 71.1 S	ZFS 71.1 T	ZFS 71.2 T	ZFS 71.3 T	ZFS 71.4 T
Rated power P_2 [kW]	1.6	1.7	1.7	3.2	3.2
Voltage U [V]	230	400	400	400	400
Frequency [Hz]	50				
Rated current consumption I [A]	10.5	3.7	3.7	6.5	6.5
Drive n [min^{-1}]	2800				
Max.discharge flow Q_{max} [m^3/h]	17				
Max. delivery height H_{max} [m]	22	22	25	35	39
Max. media temperature t_{max} [°C]	40				
Pressure connection (optional)	Flange DN50				
Weight with cable [kg]	38	38	38	44	44
Duty ratio ED	S1- continuous operation (flooded), S3- 40% (emerged)				
Minimum fluid level	Bottom line of motor housing				

Materials

Motor housing	GG 20	**Motor shaft**	1.4021
Pump housing	GG 20	**Bearing flange**	GG 20
Cutting flange	1.4112	**Impeller**	GG 20
Cutting knife	1.4112	**Other seals**	NBR, FPM
Auxiliary bearing flange	St 37-2	**Floating-ring type shaft seal**	SiC (silicon carbide)

2.4 Range of application

The submersible waste water pumps of the type series SANIPUMP® ZFS 71 are used for the drainage of sewage and wastewater tanks, excrement collection pits, sewage plants and the like in explosion-prone areas.

In this context, the following has to be pointed out (Excerpt from DIN VDE 0165):

For the installation of electrical systems in explosion-prone areas, the "directive about electrical installations in ex-plosion-prone areas" (ElexV) applies. Amongst other things, this directive regulates the question of permitting ex-plosion-protected electrical equipment and the responsibility (admission) of experts. (DIN VDE 0165 1.2)

When assessing the risk of explosion, that means when explosion-prone areas are defined, the „directives for the avoidance of dangers caused by a potentially explosive atmosphere with collection of examples – guideline on protection against explosion – (EX-RL)" are to be taken into account. If it is a matter of special cases, or if there are doubts about the definition of explosion-prone areas, the supervisory authority has to decide. (DIN VDE 0165 1.1.2)

In case of medical areas, the DIN VDE 0107 (DIN VDE 0165 1.2) applies.

In case of the installation of electrical systems in areas which are endangered by explosive materials, the DIN VDE 0166 (DIN VDE 0165 1.3) applies.

In case of the operation of electrical systems in explosion-prone areas, the DIN VDE 0105 part 9 (DIN VDE 0165 1.4) applies.

This regulation does not apply for the installation of electrical systems in mine openings which can be endangered by mine gas. Here, the norms of the set DIN VDE 0118 „Installation of electrical systems in underground mining companies" (DIN VDE 0165 1.5) apply.

Terms:

- "Explosion-prone areas" are areas in which an explosive atmosphere can occur in endangering quantities (dangerous explosive atmosphere) due to the local and operational circumstances (explosion hazard) (DIN VDE 0165 2.1).
- "Explosive atmosphere" is a conglomerate of inflammable gases, vapours, mists or dusts including the common additives (e.g. humidity) under atmospheric conditions, inside which a reaction independently reproduces itself after ignition. Atmospheric conditions are total pressures of 0.8 to 1.1 bar and conglomerate temperatures of -20 to +60°C. (DIN VDE 0165 2.2)

Please always refer to the national standards in force.

2.5 Accessories

All pumps of the type series SANIPUMP® ZFS 71 are delivered with 10 m of cable and free cable end. Switching devices for pumps with explosion protection are available as standard or special models with various level control systems.

For the installation of the pump, a supporting ring (primarily for transportable operation) or a coupling device (stationary operation) is available.

3. TRANSPORT AND TEMPORARY STORAGE

On principle, the pumps SANIPUMP® ZFS 71 should be lifted and/or transported using the eyelets on top or the handlebar designed for that purpose. Under no circumstances is the pump to be lifted on the power supply cable !

For temporary storage and conservation, it suffices if the pumps are stored in a cool, dry, frost-protected and dark place.

4. DESCRIPTION

4.1 Motors

The pumps SANIPUMP® ZFS 71 are equipped with an AC asynchronous induction motor or a three-phase asynchronous motor. Temperature sensors, which function as temperature limiters, have been integrated into each of the three motor windings. If the motor overheats for any reason, the bimetallic contacts respond to this and the motor is switched off.

The motor is to be restarted solely by hand! However, the motor may only be restarted after an error analysis has been conducted and the cause of malfunction has been eliminated.

The motors are certified by the BVS - Dortmund and have the following certificates of conformity: BVS 05 ATEX E 028 X.

4.2 Pumps

The pump housing and the impeller are made of grey cast iron; the cutting device, which is located in front of the impeller on the suction side, is made of a special alloy. This cutting device comminutes suspended soils, so that they will not enter the pump and choke it. The pumps are equipped with a flange DN 50.

4.3 Switching device

The pumps are delivered without switching device.

5. INSTALLATION

DANGER

- Disconnect the power supply before carrying out any kind of work on the plant!
- The electrical connections are not to be exposed to humidity!

5.1 Electrical equipment

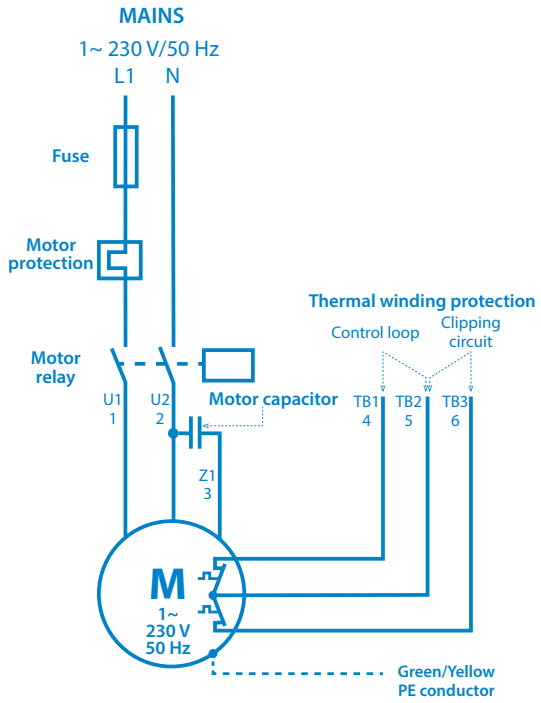
The **AC-powered model** of the pump can be operated with an auxiliary switch device which is equipped with the following elements: main switch, fuses, contactors, thermal motor protection relay, operating capacitor, restart lockout for the clipping circuit, signal lamps „Betrieb“ (operation) and „Störung“ (malfunction), Ex i - relay and a floater for the protection against dry running.
The pump is connected to an earthed wall socket with an earthed type plug by means of the cable which is con-nected to the switching device.

DANGER

- The switching device has to be installed outside the explosion-prone area!
- The floater for the protection against dry running has to be installed in such a way, so that a decline of the water level below the bottom line of the motor housing is not possible.

Further electrical installation is not necessary. If required, the motor housing can additionally be earthed by means of the external earthing terminal intended for that.

If an additional switching device is connected to the pump SANIPUMP® ZFS 71.1, it has to be connected as follows :



Three phase model :

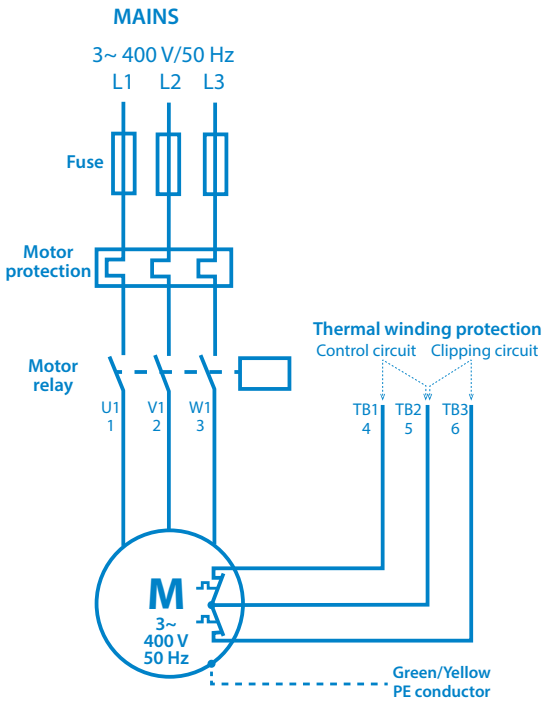
The wires of the seven-wire connection cable of the pumps (three-phase model) are marked as follows:

Green/Yellow	PE	Ground wire (earthing)
1	U1	Three windings, star connection
2	V1	
3	W1	
4	TB1	Second contact control loop
5	TB2	Shared contact control loop and clipping circuit
6	TB3	Second contact clipping circuit

DANGER

- The switching device has to be installed outside the explosion-prone area!
- The floater for the protection against dry running has to be installed in such a way, so that a decline of the water level below the bottom line of the motor housing is not possible.

Wiring diagram:



Connection of the thermal winding cover :

- Control loop : T1 and T2 must be connected in a switching device in such a way, that the following function is guaranteed: When the temperature sensors respond, the pump is switched off until the tempera-ture has dropped again. Now the pump is switched on again.

- Clipping circuit : T2 and T3 must be connected in a switching device in such a way, that the following function is guaranteed: When the temperature sensors respond, (failure of the control loop), the pump is switched off and can be restarted by hand solely. The pump may only be restarted after an er-ror analysis has been conducted and the cause of malfunction has been eliminated.

Connection to the switching device PS1-LCD and PS2-LCD:

Switching device	PS1-LCD			PS2-LCD					
	Pump 1			Pump 1			Pump 2		
Switching device	20	21	22	31	32	33	38	39	40
Pump	T1	T2	T3	T1	T2	T3	T1	T2	T3

5.2 Hydraulic system

DANGER

These pumps are not to be mounted in dry installation, since a minimum water level up to the bottom edge of the motor housing is prescribed by the guideline on protection against explosion.

Installation with supporting ring:

- Mount supporting ring to intake flange of the pump and install pump. Ensure stability of the pump.
- Optionally connect pressure side by means of flange DN 50 or thread (The pump is equipped with a female thread G2 and a flange DN 50).
- If a hose is to be laid on the pressure side, kinks are to be avoided.
- Avoid kinks during the laying of the supply cable. Lay supply cable without tensile loading and without causing chafe marks.

Installation for shaft fitting:

- Position pipe clamp on inner rim of the shaft and loosely fix it with two screws.

- Sound out position of guide pipe frame for coupling pedestal, adjust coupling pedestal on shaft bottom and mount it with the heavy-duty dowels which are included in the delivery.
- Install pressure pipe and valves in a tension-free manner.
- Slip the guide pipe on the coupling pedestal, shorten it to correct length, slip on pipe clamp and tighten it for good.
- Mount coupling element and lowering chain to the pump, lower pump with the chain (insert guide pipe into coupling element) and couple it, hang the chain up on the pipe clamp so that it is ready to hand.
- Lay supply cable. Avoid kinks and lay supply cable without tensile loading and without causing chafe marks.

5.3 Level control system

The pumps SANIPUMP® ZFS 71 have to be controlled by means of a level control in such a way, that a decline of the water level beneath the minimum allowable level (bottom line of motor housing) is avoided at all costs.
The level control can be effected by means of a floating switch, electropneumatically (press switch) or by means of other applicable methods. The switching point of the pump should be set in such a way, that the pump is entirely submersed under water.
If the level control is effected via a floating switch, the signal of the floaters has to be transmitted via intrinsically safe Ex i –relays.

6. COMMISSIONING

Check all connections for correct assembly, set gate valve on passage and check level control system for proper operation.

During the initial test run, check pipes for tightness and reseal them, if necessary.

7. MAINTENANCE AND REPAIR

DANGER

Disconnect the power supply before carrying out any kind of work on the plant!

After an operation time of six to twelve months, the oil storage inside the seal carrier always has to be controlled as follows: put the pump on its side on a clean surface and position it in such a way that the oil filling screw faces upwards. Take out the screw and check the oil level. If only a small quantity of oil is lacking, the oil storage can be filled up without any problems. If a considerable quantity of oil is lacking, or if the oil is mingled with water, the customer department has to be informed.

All other maintenance works on the pump and on the electrical equipment should be carried out by the manufacturer or an authorised qualified company in intervals of six to twelve months (or also in shorter intervals, according to case of operation). Please immediately inform the customer department in case of damage to the pump and/or the electrical equipment.

8. MALFUNCTIONS, CAUSES AND TROUBLESHOOTING

DANGER

Disconnect the power supply before carrying out any kind of work on the plant !

Malfunction	Cause	Elimination
1. Motor is not rotating	- absence of line voltage or improper line voltage	- check voltage supply
	- incorrect connection	- correct the connection
	- defective power cable	- replacement (customer service)
	- defective/wrong capacitor	- replacement (customer service)
	- impeller/cutting knife blocked	- cleaning
	- activated motor protection (overheating, blocking, improper voltage or other malfunction)	- inspection, inform customer service
	- control malfunction/defective floating switch	- inspection, inform customer service
	- motor defective	- replacement (customer service)
2. Motor rotates but does not convey	- impeller blocked or worn out	- cleaning/replacement
	- check valve blocked	- cleaning
	- gate valve blocked/closed	- cleaning/opening gate valve
	- pressure pipe blocked/hose buckled	- cleaning/eliminating kinks
	- intake socket blocked	- cleaning
	- incorrect rotating direction	- correction
	- water deficiency inside the shaft	- switch off/inform customer service
3. Motor switches off during start-up	- voltage improper or unsteady	- correction/customer service
	- thermal protection laid out incorrectly	- inspection/customer service
	- current consumption too high	- customer service
4. Motor does not switch off	- control malfunction	- customer service
	- wrong/defective floating switch	- replacement/customer service

9. WARRANTY

As the manufacturer, we provide a warranty of 24 months on these pumps from date of purchase.

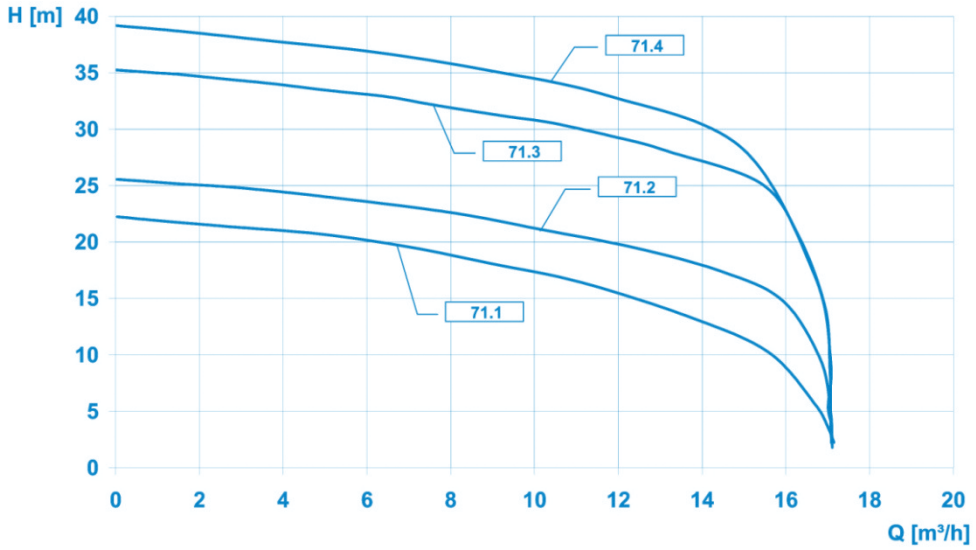
Your sales receipt will act as a proof of warranty. During that warranty period, we gratuitously remedy all deficiencies which are attributed to material or fabrication defects by either repairing the plant, or by replacing the defective parts (to our choice).

Defects which are attributed to misuse or wear are excluded from warranty. We will assume no responsibility for consequential damages that are caused by a breakdown of the plant. In case of a warranty claim, please contact your specialist retailer.

10. TECHNICAL MODIFICATIONS

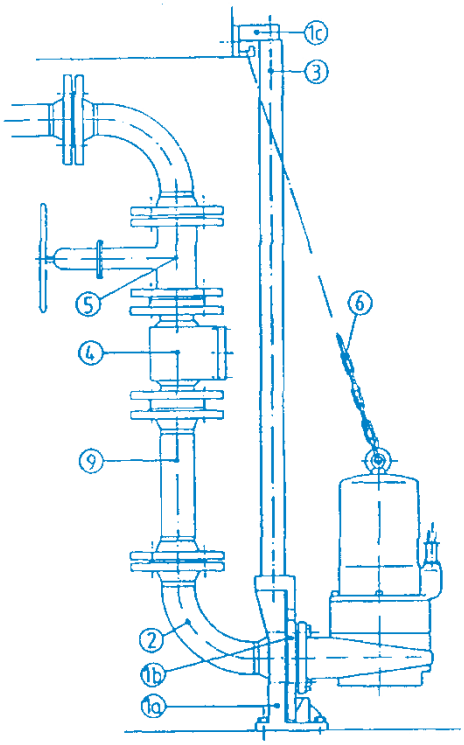
We reserve all rights for technical modifications in terms of further development.

Appendix A: Characteristic curves



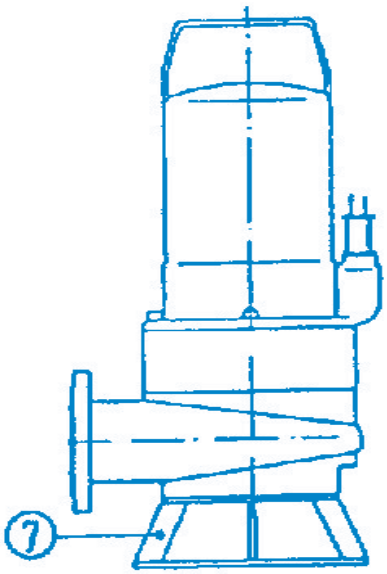
Appendix B: Installation suggestions

Fixed installation



1a	Coupling pedestal
1b	Guide piece
1c	Pipe clamp
2	Flange elbow
3	Guide pipe 5/4''

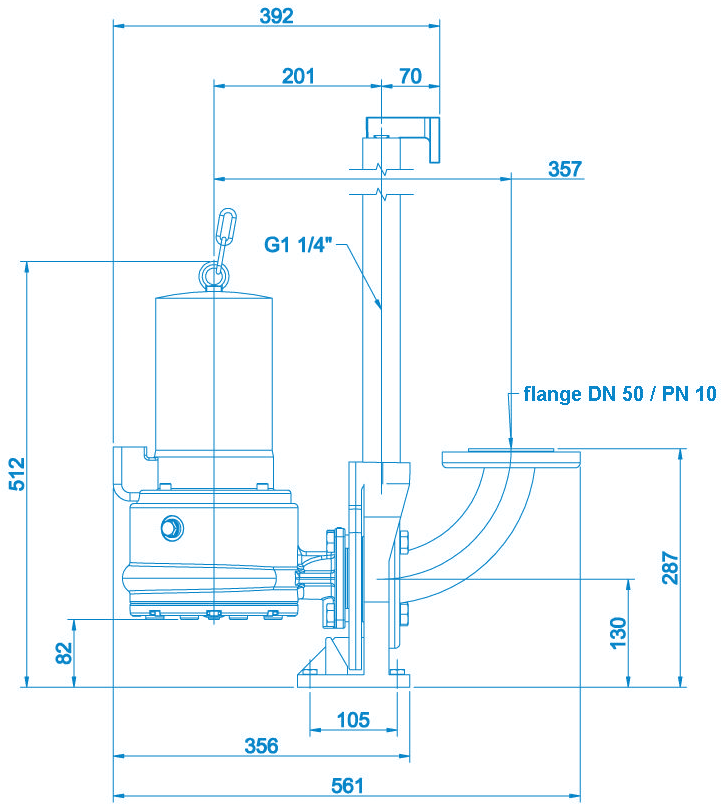
Portable installation



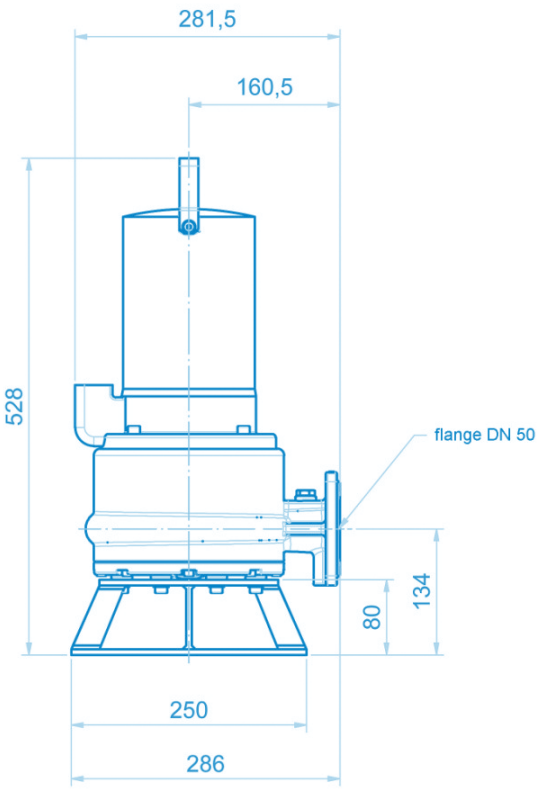
4	Backflow preventer
5	Wedge-type flat slide valve
6	Lowering chain with clevis
7	Supporting ring
9	Pressure pipe

Appendix C: Pump dimensions

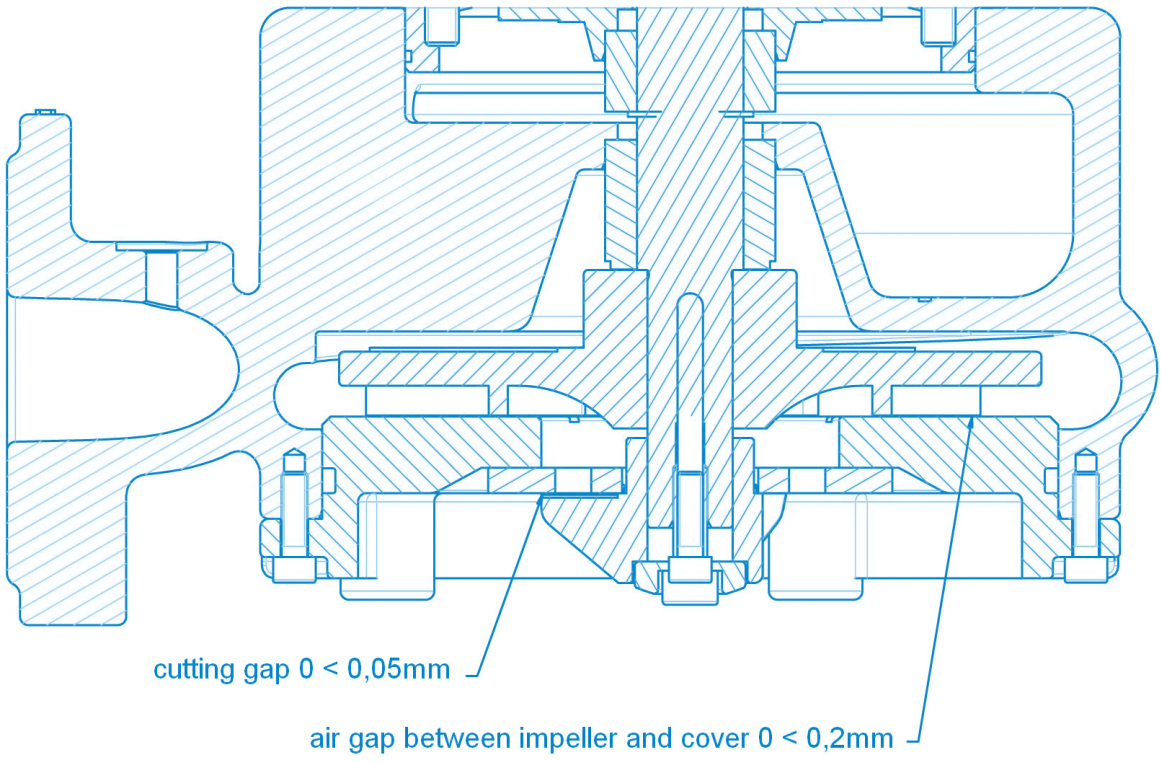
Fixed installation



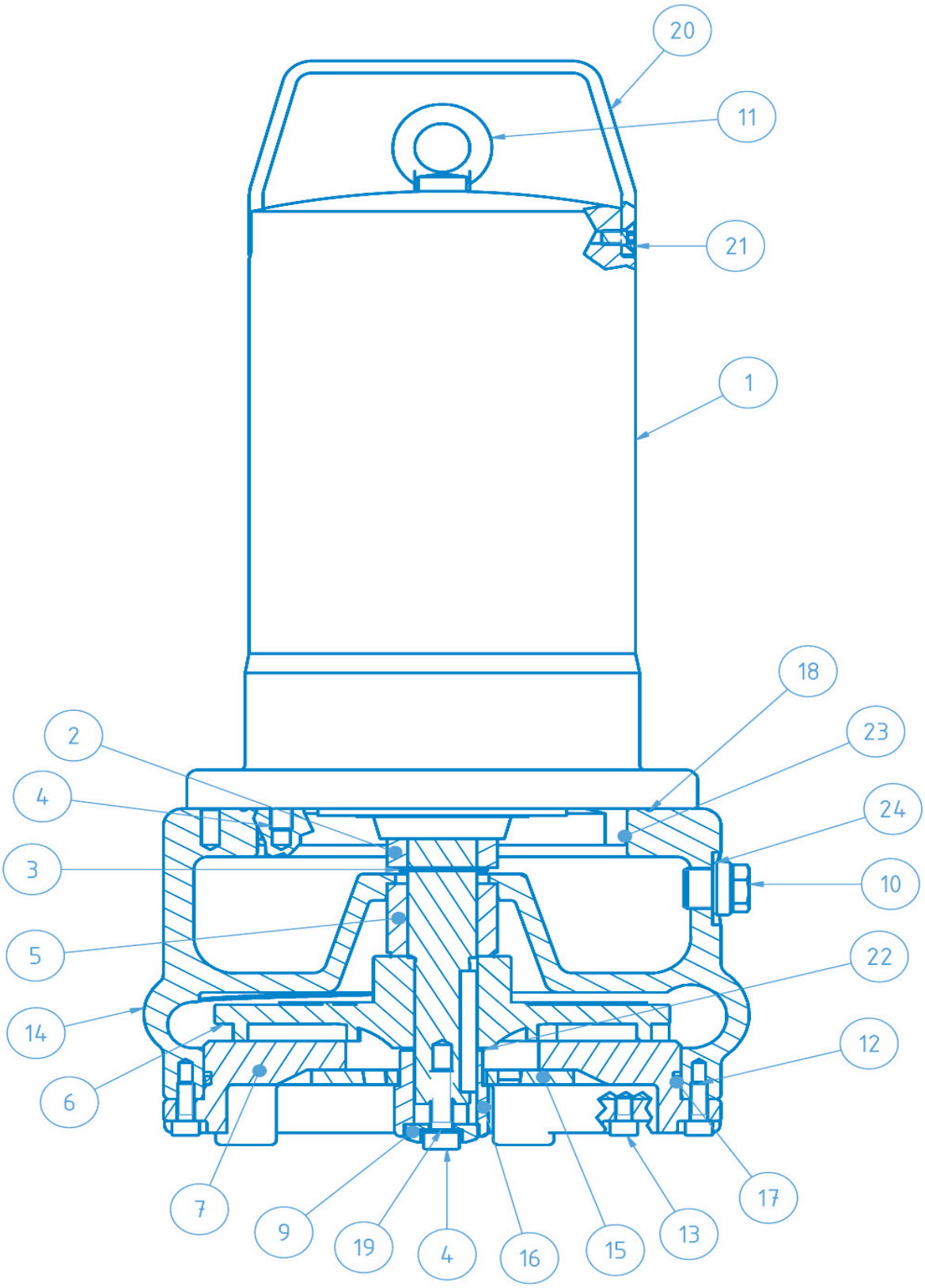
Portable installation



Adjustment values for cutting gap and pump hydraulics



Appendix D: Sectional drawing and list of spare parts



Pos.	Art. Nr.	Designation	Quantity
1	17369	Motor complete SANIPUMP® ZFS 71.1 S 230 V	1
1	17368	Motor complete SANIPUMP® ZFS 71.1 T and ZFS 71.2 T 400 V	1
1	17370	Motor complete SANIPUMP® ZFS 71.3 T and ZFS 71.4 T 400 V	1
2	17356	GLRD LD1/25-G38 motor side	1
3	11679	Locking ring DIN471-A25x1,2	1
4	16381	Hexagon socket screw M8x25-A2	5
5	17377	GLRD MG1/25-G6 medium side	1
6	17373	Impeller ZFS 71.1 Ø135	1
6	17371	Impeller ZFS 71.2 Ø145	1
6	17372	Impeller ZFS 71.3 Ø160	1
6	17351	Impeller ZFS 71.4 Ø170	1
7	17350	Lid ZFS 71	1
8	17109	Countersunk screw M5x10-A2 DIN965	3
9	17352	Knife screwing ZFS 71	1
10	11640	Sealing screw, bea. G 3/8 (ventilation)	1
10	11639	Sealing screw G3/8 DIN910 (oil)	1
11	11663	Ring screw DIN 580-M8-A2	1
12	15320	Hexagon socket screw M6x20-A2	4
13	10008	Hexagon socket screw M6x10-A2	4
14	17355	Pump housing ZFS 71	1
15	17353	Cutting plate ZFS 71	1
16	17354	Cutting knife ZFS 71	1
17	11822	O-ring 160 x 3,5-NBR70	1
18	11629	O-ring 147 x 3	1
19	11672	Sealing ring 8x14x1 Cu	1
20	11659	Handle	1
21	10666	Hexagon socket screw M6x12-A2 DIN 912	2
22	17375	Shim ring 10x30x0,1 1.4301	2
22	17376	Shim ring 10x30x0,5 1.4301	2
23	11656	O-ring 125x2-NBR70	1
24	11646	Sealing ring 17x22x1,5 Cu für Pos 230	2
70	11645	Tooth lock disc S8x13x0,8 A2	4
	11690	Wisura technical white oil NFW	0.4 L

AUSTRALIA

SFA Saniflo Australia Pty Ltd Unit 9-10, 25 Gibbes Street Chatswood
NSW 2067
Tel. +61 298 826 200

NEW ZEALAND

SFA Saniflo New Zealand Ltd
PO Box 383 Royal Oak,
Auckland 1345
Tel : 09 390 4615

SERVICE HELPLINES

Australia
Tel. +1300 554 779

New Zealand
Tel. 0800 107 264

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