

Sewage Ejection Unit with grinding device

GB

Stations de relevage d'effluents avec broyeur

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Miniboy SEN



Operating Manual
Manuel d'utilisation

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Declaration of Conformity

- in terms of the EC Low Voltage Directive 93/68/EEC, Appendix I
- in terms of the EMC Directive 92/31/EEC and 93/68/EEC
- in terms of the 2006/42/EG

We, the **ZEHNDER Pumpen GmbH**
Zwönitzer Strasse 19
08344 Grünhain - Beierfeld,

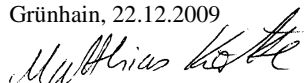
hereby declare that the effluent lifting units of type Miniboy SEN correspond to the relevant directives:

- EC Low Voltage Directive 93/68/EEC, Appendix I
- EMC Directive 92/31/EEC and 93/68/EEC
- 2006/42/EG

Applicable compliant norms, especially

- EN 809 Status 1998
- EN 60 335-1 Status 2006 (draft)
- EN 60 335-2-41 Status 2004
- EN 50 081-1 Status 1993
- EN 50 082-1 Status 1994

Grünhain, 22.12.2009



Matthias Kotte
Product Development

1. General

1.1 Introduction

This Operating Manual applies to the effluent lifting units with cutting unit pump(s) of the Miniboy SEN production series.

The warranty automatically expires if the Operating Manual is not observed - especially the safety instructions - and also if the device undergoes unauthorised re-equipment, or if non-original spare parts are installed into it. The manufacturer is not liable for any damage resulting from this!

Like every other electrical device, this product is also liable to fail through lack of main power supply or a technical defect. If damage may ensue for you for these reasons, you should plan an emergency power supply unit according to usage, a manual diaphragm pump, a second system (double system) and/or an alarm unit independent of the mains. As manufacturers, we are happy to advise you at any time, also after purchase. Please consult your dealers in case of any defects or cases of damage.

Manufacturer: ZEHNDR Pumpen GmbH
Zwönitzer Strasse 19
08344 Grünhain-Beierfeld

Construction sizes:	Miniboy SEN 1.5	Miniboy Doppel SEN 1.5
	Miniboy SEN 2.2	Miniboy Doppel SEN 2.2
	Miniboy SEN 3.0	Miniboy Doppel SEN 3.0
	Miniboy SEN 4.0	Miniboy Doppel SEN 4.0
	Miniboy SEN 5.0	Miniboy Doppel SEN 5.0

Status of the Operating Manual: March 2009

1.2 Queries and orders

Please direct queries and orders to your specialist dealers.

1.3 Technical data

Type	Power P ₁ [kW]	Power P ₂ [kW]	Voltage U [V]	Nominal current I _N [A]	Speed at 50 Hz [n ⁻¹]	Pressure joints	Supply
Miniboy SEN 1,5 W	3,1	2,2	230	13,5	2800	DN 50	DN 100
Miniboy SEN 1,5 D	2,7	2,2	400	4,0	2800	DN 50	DN 100
Miniboy SEN 2,2 D	2,7	2,2	400	5,5	2800	DN 50	DN 100
Miniboy SEN 3,0 D	5,1	4,0	400	7,2	2800	DN 50	DN 100
Miniboy SEN 4,0 D	5,1	4,0	400	9,0	2800	DN 50	DN 100
Miniboy SEN 5,0 D	2,7	2,2	400	5,5	2800	DN 50	DN 100
Miniboy Doppel SEN 1,5	2,7	2,2	400	4,0	2800	2 x DN 50	DN 100
Miniboy Doppel SEN 2,2	2,7	2,2	400	5,5	2800	2 x DN 50	DN 100
Miniboy Doppel SEN 3,0	5,1	4,0	400	7,2	2800	2 x DN 50	DN 100
Miniboy Doppel SEN 4,0	5,1	4,0	400	9,0	2800	2 x DN 50	DN 100
Miniboy Doppel SEN 5,0	2,7	2,2	400	5,5	2800	2 x DN 50	DN 100

Type	Gross volumes V [l]	Required space L x W [m x m]	Flow rate Q _{max} [m ³ /h]	Flow height H _{max} [m]	Cable length L [m]	Weight m [kg]
Miniboy SEN 1,5 W	140	1 x 1	22	13	3,5	48
Miniboy SEN 1,5 D	140	1 x 1	22	13	3,5	48
Miniboy SEN 2,2 D	140	1 x 1	24	15	3,5	48
Miniboy SEN 3,0 D	140	1 x 1	26	22	3,5	53
Miniboy SEN 4,0 D	140	1 x 1	26	27	3,5	53
Miniboy SEN 5,0 D	140	1 x 1	22	22	3,5	49
Miniboy Doppel SEN 1,5	200	1,5 x 1,5	22	13	3,5	88
Miniboy Doppel SEN 2,2	200	1,5 x 1,5	24	15	3,5	88
Miniboy Doppel SEN 3,0	200	1,5 x 1,5	26	22	3,5	98
Miniboy Doppel SEN 4,0	200	1,5 x 1,5	26	27	3,5	98
Miniboy Doppel SEN 5,0	200	1,5 x 1,5	22	22	3,5	89

Maximum medium temperature: 55°C

Materials

Container	PE HD
Pump housing	GG 20
Rotor	GG 20
Seal supports	GG 20
Cutting flange	Stainless steel
Cutting blade	Stainless steel
Motor shaft	Stainless steel
Seals	NBR, FPM
Axial face seals	SiC (silicon carbide)

1.4 Area of usage

The effluent lifting units of the Miniboy SEN production series are used for the disposal (collection and conveying) of domestic and industrial effluent that develops underneath the canal backflow level.

The model with cutting unit pumps enables pumping off over greater conveying heights and pressure main lengths. The pressure main may be laid at a dimension of DN 50.

Double systems are used wherever an interruption of the effluent disposal system is not permitted to occur, in terms of DIN 1986.

1.5 Scope of delivery

The effluent lifting units of the Miniboy SEN production series are delivered with:

- assembled cutting unit pump(s) of the ZFS 70 production series
- Connection for emergency evacuation
- Pneumatic control and switch boxes
- Inflow bend DN 100
- Flexible connection for ventilation of the collection chamber
- Pressure decrease bend DN 50
- Back-kick flap(s) DN 50
- Forked pipe DN 50/50/50 (only for double system)

2. Safety:

(from "VDMA Einheitsblatt 24 292" - German Association of Machine Constructors Standard Sheet)

This Operating Manual contains fundamental instructions that are to be observed when setting up, operating and maintaining the machine/system. Hence it is imperative that this Operating Manual be read by the technician and the responsible specialist personnel/operators before assembly and initial operation and be permanently available at the site of usage of the machine/system.

You are bound to observe not only the general safety instructions that can be found under the main point Safety, but also other special safety instructions added to other main points, for example for private usage.

2.1 Marking of instructions in the operating manual

Safety instructions contained in this Operating Manual that if unobserved may cause danger to persons are specially marked with the general danger sign



Safety sign according to DIN 4844 - W 9,

for warning against electrical voltage with



Safety sign according to DIN 4844 - W 8

The word **CAUTION** is added to safety instructions where non-observance can cause damage to the machine and its functions.

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.

2.2 Personnel qualifications and training

The personnel responsible for operating, maintaining, inspection and assembly of the machine/system have to be appropriately qualified for whatever work they do. The customer is responsible for exactly regulating areas of responsibility, authority and monitoring of personnel. Should personnel not avail of the necessary knowledge, they are to be trained and instructed. This can be done, if necessary, by the manufacturer/supplier, on commission of the buyer of the machine. Furthermore, the customer has to ensure that personnel have fully understood the contents of the Operating Manual.

2.3 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

2.4 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.

2.5 Safety instructions for the customer/operator

- Should hot or cold machinery lead to hazards, the customer has to provide that these parts are secured against being touched.
- 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 the VDE [German Electrical Engineer Association] regulations and those of the local power supply companies).

2.6 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 urgently maintained.

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.

2.7 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.

2.8 Prohibited methods of operation

Operational safety of the delivered machine is only guaranteed when it is used appropriately according to Section 1 - General - in the Operating Manual. The limit values specified in the data sheet may on no account be exceeded.

3. Transport and interim storage

3.1 Transport

The effluent lifting units of the Miniboy SE production series may not be thrown or dropped. Moreover, they are to be transported in a horizontal position.

3.2 Interim storage/conservation

The machine can be kept in interim storage and conserved in a cool, dark, dry and frost-free site. The systems should stand in horizontal position.

4. Description

4.1 General

The effluent lifting units of the Miniboy SEN production series are single and double systems that are ready to plug in and safe against flooding, with collection chambers made of gas- and smell-proof plastic. They work with vertical cutting unit pumps with automatic pneumatic level control. They are completely equipped with switch boxes and all necessary switching elements.

4.2 Construction and work method

The effluent falls into the collection chamber of the Miniboy SEN effluent lifting unit through the 90° DN 100 (HT pipe) inflow bend included in delivery.

The water rises in the back-up pipe screwed onto the top side of the chamber and compresses the air located in the back-up pipe until the pressure activates the banking up pressure switch in the switch box. This switches on the pump and conveys the water out of the chamber via the pressure main in the canal lying above. The Miniboy SEN Doppel has a changeover switch in the switch box, which means the pumps can be switched on alternately. Only when overload operation takes over (one pump cannot manage the supply flow of water) does the second pump switch on.

One or two (for double systems) back-kick flaps in the pressure main (to be provided according to DIN 19 760) prevent the return flow of the water from the pressure main into the chamber.

The switching system is provided with an acoustic alarm sensor, which is activated when the pump(s) fail(s) or when the supply flow is too strong. The motor is automatically switched off at overload (excessive current consumption or excessive coil temperature).

5. Installation

5.1 Preparations

- A fault-free operation of the lifting unit is not least dependent on a correct and flawless assembly. For this reason you have to note the following points:
- The set-up site should be a room that is well ventilated, dry and free of frost.
- The set-up site must be sufficient in dimensions. The height of the room should be around 2 to 2.5 m. According to DIN 1986 part 3: *"...All system parts...(and)... all operating elements...have to be accessible at all times and be operable without difficulties. ...These system parts are not to be blocked by stored commodities, furniture, cladding, casings and so forth..."*
- The substructure of the set-up site is to be designed to bear the potential loads, depending on system size.
- Lower interior spaces tend to collect water from the water table or percolation water. Therefore there should be a small shaft in the corner of the room, where these liquids collect and can be disposed of with a cellar drainage pump.
- A hook in the ceiling above the set-up site of the lifting unit facilitates assembly and potential maintenance and repair work on the pump.
- Prior to assembly, all construction and connection measurements should be checked and compared with the dimensions of the system. Here you should pay special attention that the constantly downward-inclining supply connection never lies lower than the inflow height of the collection chamber.

5.2 Assembly

Pay urgent heed during assembly to a voltage-free and leak-proof installation of the pipelines and fittings.

Set-up:

The effluent lifting units of the Miniboy SEN production series are aligned on the set-up site according to whatever pipelines are provided. It is set up horizontally and fastened to the floor by means of the fixing screws supplied in delivery.

DIN 19 760 Part 1: *"...The excrement lifting installation is to be designed so that distortion and buoying upwards caused by fixing devices are avoided ..."*

Supply:

The supply connection is attached at the inflow bend supplied in delivery (single system) or directly onto the chamber (double system). It must always lie at a downward incline. Ascending stretches along the supply line are prohibited.

Important:

When using the minimum supply height of 250 mm for the single systems and 285 mm for the double systems, note that the level control system is adjusted so that during normal operation the water level in the chamber rises a little above the lower edge until the supply pipe is filled to a maximum of $\frac{1}{2}$ before the pump switches on. Hence, a corresponding water level adjusts for all pipes that are connected lower. This may mean that dirt deposits cannot be excluded in supply lines in this area and in extreme cases may cause a stoppage of the pipe.

Pressure main:

A bend DN 50, 90° is mounted as standard on the horizontal pressure discharge of the pump, which ends in vertical direction drilled with a flange DN 50, PN 10/16.

The installation of one or two back-kick flaps (for double systems) is imperative in the pressure main of the lifting unit: DIN 19 760 Part 3: *"...After interruption of the supply flow, back-flow inhibitors have to prevent back-flow of the effluent from the pressure main automatically. When the inflow supply starts, the back-flow inhibitor must open automatically..."*

We thus recommend the installation of a gate valve behind the back-kick flap, to facilitate any cleaning or exchange of the back-kick flap. The pressure main has to ascend continuously and without unnecessary jumps in a bend above the backflow level and then fall continuously to the canal connection. Pipe connection and fittings may have to be supported with pipe clips or brackets.

Ventilation:

The chamber ventilation system DN 65 is either connected directly to the ventilation pipe of the building or separately installed via the roof.

Electrical Connection:

The switch box has to be attached in such a way that the pneumatic hose for the pneumatic level control system lies at a continuous ascending incline. Only thus can a fault-free function of the automatic control system be guaranteed. The system plug (CEE, shockproof socket for single systems) is plugged in directly before initial operation. Pay heed here that the electrical system corresponds to the valid VDE (German Electrical Engineering regulations) directives. The mains supply for double systems is designed according to the circuit diagram.

The circuit diagram for wiring the lifting unit is in the switch box and should be left there for the convenience of the maintenance and customer service personnel.

6. Initial operation

Prior to initial operation, all connections should be checked once more for correct assembly, the gate valve must be open.

Now insert the plug into the socket and, for rotary current systems, check the rotational direction of the pump. This can be done by setting the manual/0/automatic switch briefly to "Manual". When the motor runs down, the rotational direction seen at the viewing port on the top side can be compared with the correct rotational direction (rotational direction arrow). Should the pump be running in a reverse direction, two of the three phases have to be exchanged.



Pull the mains plug before you do any work at the electrical system!

Now set the manual/0/automatic switch to "Automatic" and do a trial run. To do this, the collection chamber is filled through the normal inflow (washbasin, toilet, etc.). The system has to switch on automatically, pump the chamber empty and switch on again. After switch-off, no water may run back into the chamber from the pressure main.

Correct the follow-up time according to installation conditions and conveying height so that the pump evacuates the collection chamber to a maximum and only runs dry for a short time (loud noise when pumping). The back-flow pipe may no longer be immersed into the liquid after the pumping process is finished. The follow-up time can be changed by means of the digital potentiometer on the switch device.

During the trial run, recheck all connections and fittings for leakage and re-seal where necessary. If the lifting unit is running properly, the switch remains in the "Automatic" setting.

7. Maintenance/repairs**7.1 Inspection and maintenance intervals**

Inspection and maintenance intervals according to DIN 1986 Part 31: *"Effluent lifting installations should be checked once a month by the customer by monitoring one switching cycle for operational capability and leakage ...The system is to be serviced by a specialist. Inspection and maintenance intervals should be no longer than*

1. 3 months for systems in commercial operations
2. 6 months for systems in multiple family residences
3. 1 year for systems in single family houses

7.2 Maintenance work

Pull the mains plug before you do any work at the system!

Collection chambers:

Open the inspection lid and spray out the chamber with a hose to remove dirt layers on the chamber walls.

Back-kick flap:

Open the inspection lid and clean the back-kick flap from within.

Other:

All other maintenance work has to be carried out by the customer service department.

8. Malfunctions, causes and elimination

Pull the mains plug before you do any work at the system!

Fault	Cause	Elimination
1. Motor is not running	<ul style="list-style-type: none"> - voltage too low, lack of voltage - Wrong power connection - Electric cable defective - Fault at condenser - Rotor blocked - Motor protection system switched off because of overheating, blocking, voltage error - Control system error / Pressure switch defective - Pneumatic hose or connection leaking - Motor defective 	<ul style="list-style-type: none"> - Check main supply - Correction - Replacement/ Customer service department - Replacement/ Customer service department - Clean - Check/Customer service department - Check/Customer service department - Check/Replace - Replacement/ Customer service department
2. Motor running but is not conveying	<ul style="list-style-type: none"> - Rotor stopped up or worn - Back-kick flap stopped up - Gate valve stopped up or closed - Pressure main stopped up - Suction joints stopped up - Rotational direction wrong - Lack of water in the chamber - Chamber ventilation stopped up - Pump housing ventilation stopped up 	<ul style="list-style-type: none"> - Clean/replace - Clean - Clean/open - Clean - Clean - Correction - Switch off/ Customer service department - Clean - Clean
3. Motor runs then switches off	<ul style="list-style-type: none"> - Voltage error, or fluctuates - Thermo-protection wrongly set - Current consumption too high 	<ul style="list-style-type: none"> - Correction/Customer service department - Check/Customer service department - Customer service department
4. Motor does not switch off	<ul style="list-style-type: none"> - Control system fault - Pressure switch function not in order 	<ul style="list-style-type: none"> - Customer service department - Replacement/ Customer service department

9. Warranty

As manufacturer, we assume a warranty for this device for 24 months as of purchase date.

The legal document certifying this is your purchase invoice. Within this warranty term we eliminate by repair or replacement according to our option all deficiencies caused by material or manufacturing faults.

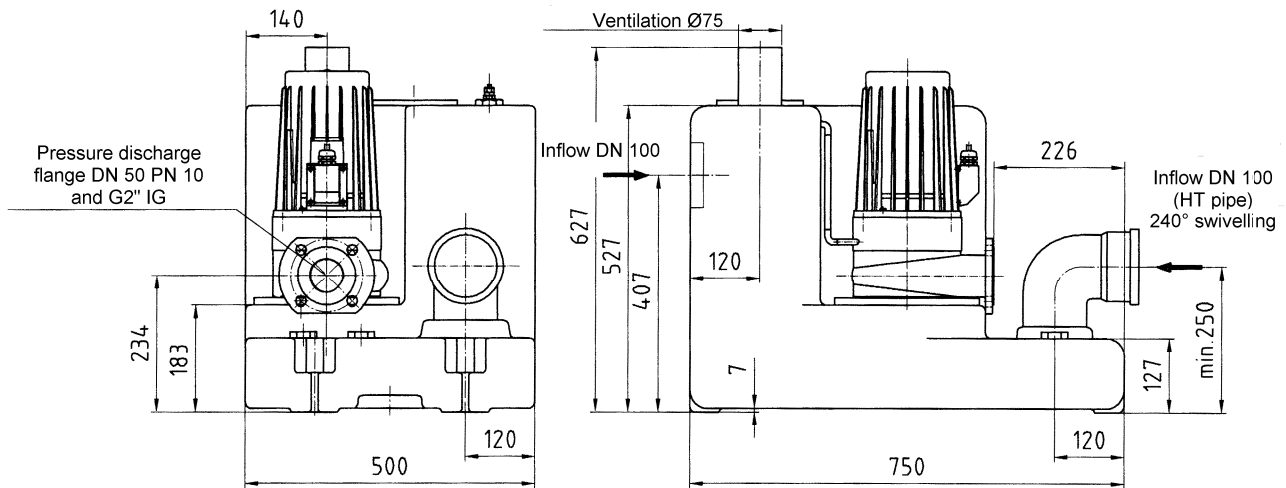
Excluded from the warranty is damage that is caused by inappropriate use and wear and tear. We are not liable for damage consequent to a failure of the device.

10. Technical modifications

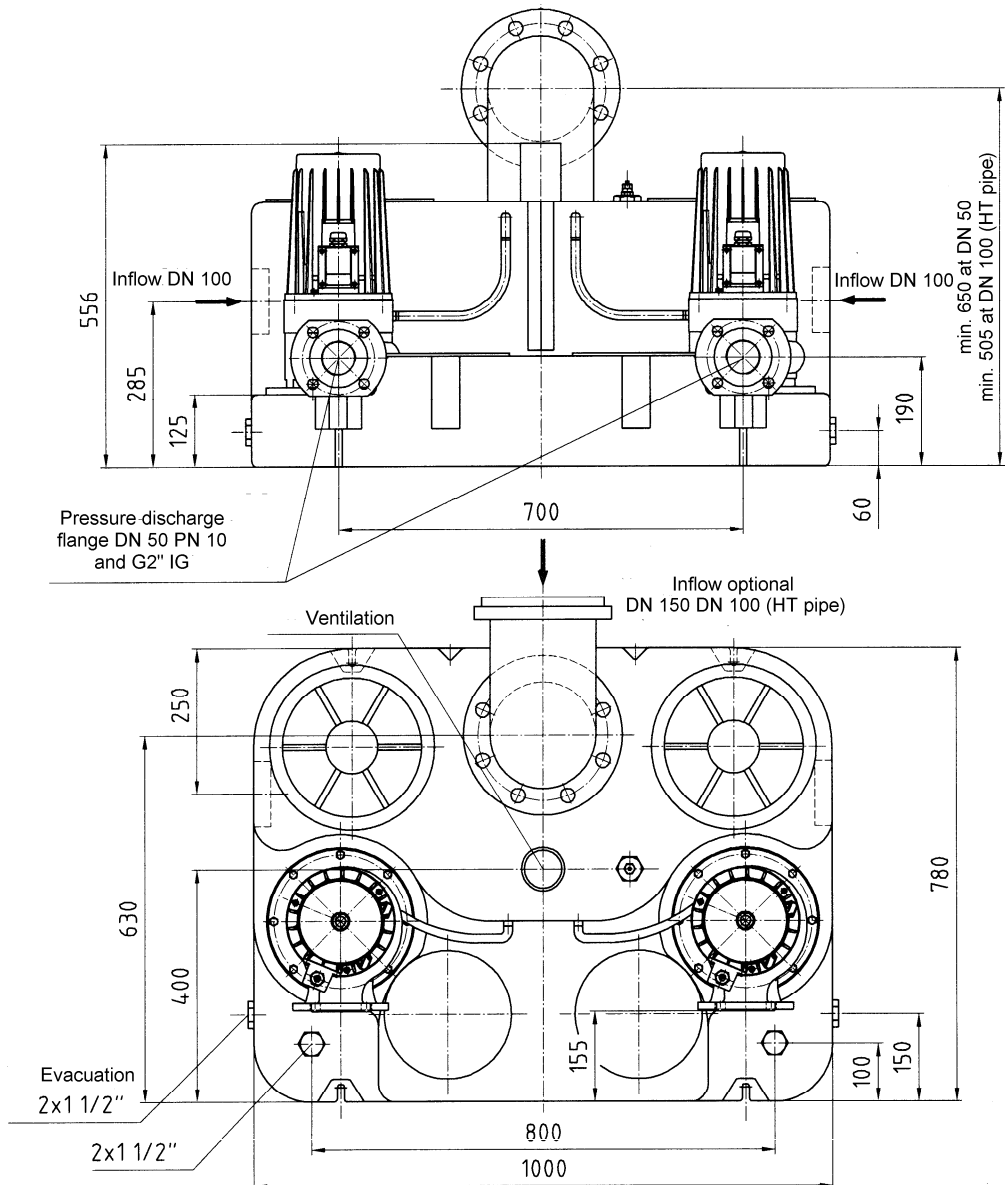
We reserve all rights for technical modifications in terms of further development.

11. Main dimensions

Miniboy SEN



Miniboy Doppel SEN

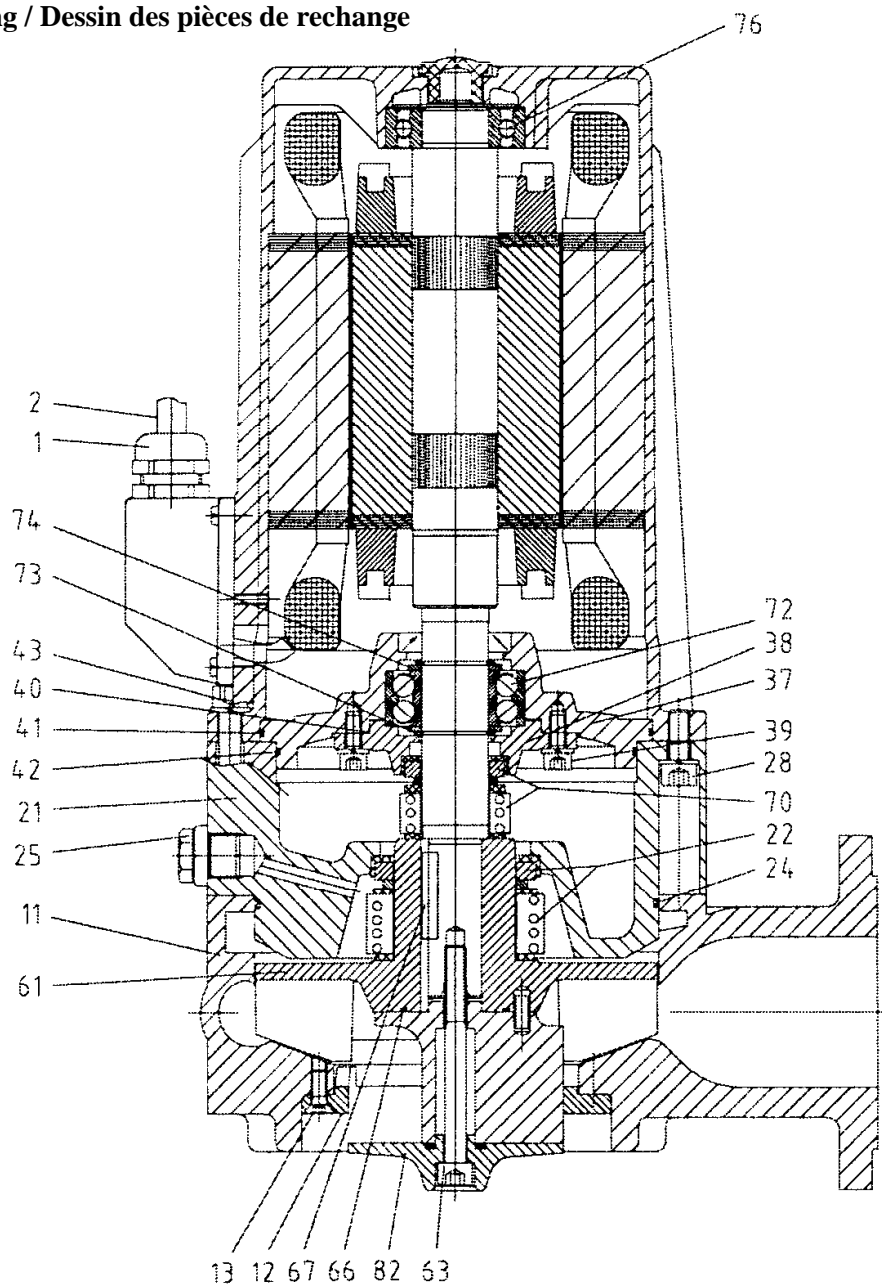


12. Spare parts list

Pos.	Item	Designation	Article no.
	1	Chamber Miniboy SEN	117304
	(1)	Chamber Miniboy Doppel SEN	117417
	1	Hose nozzle straight R 3/8"	117191
	1	Backflow pipe complete	60219
	1(2)	Inspection lid	117012
	3	PVC blind plug G 1½"	117320
	1	Switching device Miniboy SEN 230 V	200102
	1	Switching device Miniboy SEN 400 V	255302
	1	Switching device Miniboy Doppel SEN	255402

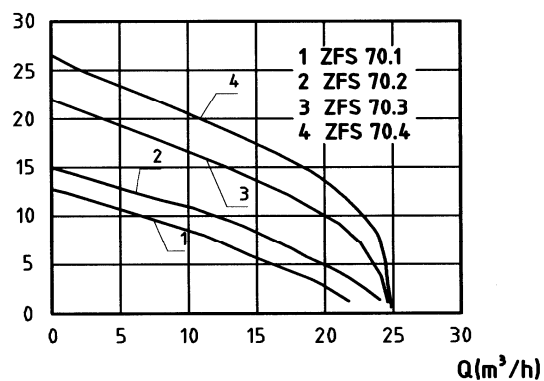
Spare parts list, pump

Pos.	Item	Designation	Article no.
	1	Motor unit compl.1.5 -230 V (ZFS-T- 70.1 W)	14014
	1	Motor unit compl.1.5 -400 V (ZFS-T- 70.1 D)	14015
	1	Motor unit compl.2.2 -400 V (ZFS-T- 70.2 D)	14025
	1	Motor unit compl.3.0 -400 V (ZFS-T- 70.3 D)	14033
	1	Motor unit compl.4.0 -400 V (ZFS-T- 70.4 D)	14043
		Motor unit consisting of	
	1	Submersible motor 2.2 kW 230 V	600.120
	1	Submersible motor 2.2 kW 400 V	600.122
	1	Submersible motor 4.0 kW 400 V	600.140
11	1	Pump housing	140011
12	1	Cutting flange	140012
21	1	Seal supports	140021a
22	1	Axial face seal, pump side	140022
24	1	O-ring 140x2.5	140024
25	1	Angle porcelain bush R 3/8" for ventilation	117031
26	1	Oil drain screw R ¼",	140026
28	4	Hexagon socket screw M 8x20-vz	140047
37	1	Bearing flange	140037a
38	1	Auxiliary bearing flange	140038
39	4	Hexagon socket screw M 6x 14-vz	140039
40	1	O-ring 60x1	140040
41	1	O-ring 147x3	140019
42	1	O-ring 125x2	140042
43	4	Hexagon socket screw M 8x85-vz	140043
61	1	Rotor 1.5	140161
	1	Rotor 2.2	140261
	1	Rotor 3.0	140361
	1	Rotor 4.0	140461
62	1	Cutting blade	140062
63	1	Hexagon socket screw M 8x25-A2	ZE1131
66	1	O-ring 35x2	140066
67	1	Feather key A6x6x32	140067
70	1	Axial face seal, motor side	140070
72	1	Angular contact ball bearing 5205	140072
73	1	Shaft securing ring A 25x1.2	140073
74	2	Supporting ring SS 25x35x2	140074
76	1	Ball bearing 6203-2RS1	140076
77	1	Shaft securing ring A 17x1	140077
78	1	Supporting ring SS 17x24x1.5	140078
82	1	Rotor washer with seal	140079
	1	Oil filling seal support 0.85 l	140099



Characteristics / Diagramme de puissance

H(m)



H(m)

