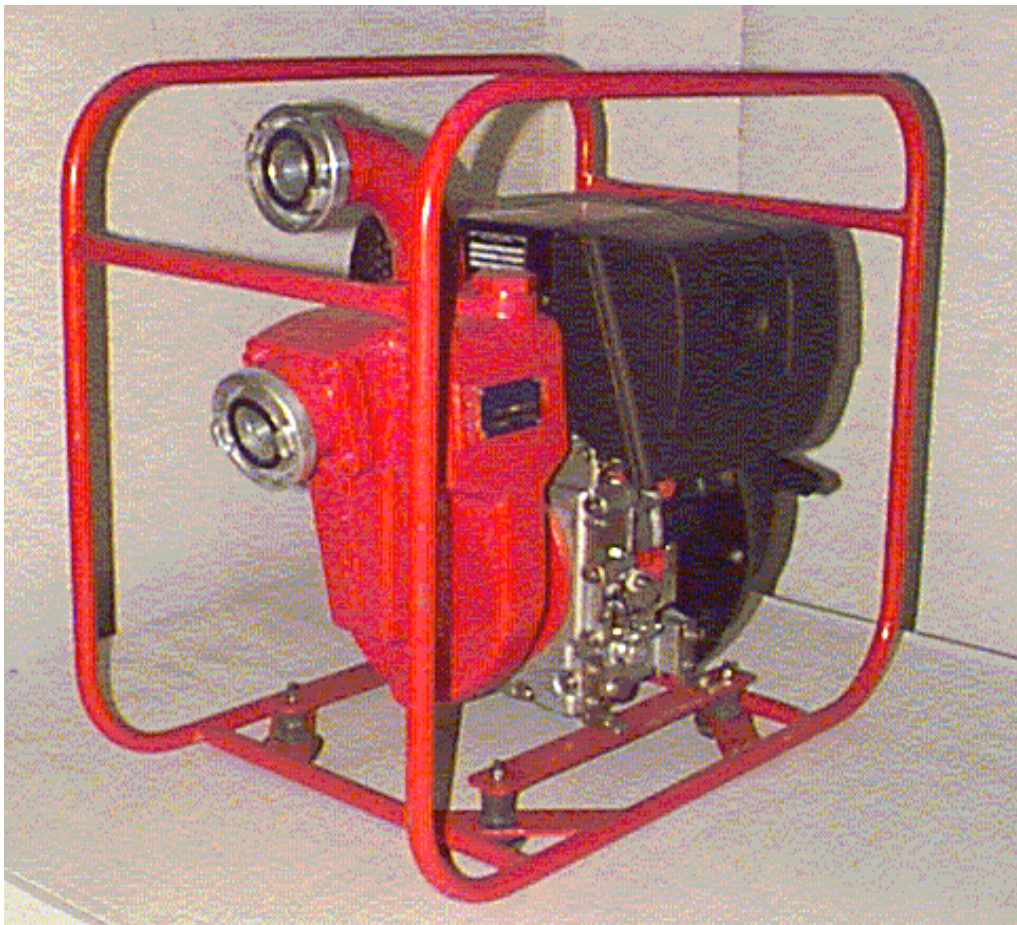


OPERATION AND MAINTENANCE INSTRUCTIONS

## DESMI portable centrifugal pump

SA50-T (50-135/14) HATZ 1B20/30



### DESMI A/S

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Special pump No.:.....

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## 1. GENERAL INFORMATION

### 1.1 PRODUCT DESCRIPTION

DESMI SA50-T is a portable centrifugal pump. The pump is a single-stage self-priming centrifugal pump with stainless steel shaft, and mechanical shaft seal, and is further equipped with a semi-open impeller, which does not choke as easily as a closed impeller.

SA50-T is equipped with quick release couplings in aluminium on both suction and pressure branch. Further it can be equipped with a Hatz engine of type 1B20 or 1B30. Pump and engine are mounted in a tubular frame.

The pump is suited for clean and polluted liquids.

The pump is equipped with a clack valve in the suction branch of the pump which is mounted well above impeller inlet. This is an advantage as the pump will not lose all the priming water and consequently the priming ability in case of a leaking clack valve.

The pump shaft is fitted direct on the engine shaft.

As the pump is self-priming, a foot valve will not be necessary on the suction line, just as the pump, contrary to ordinary centrifugal pumps, will resume pumping if, for a short moment, the liquid has been lowered to a level below the suction pipe.

The pump casing and the intermediate piece are cast in an aluminium alloy.

The Hatz engine of type 1B20 or 1B30 is a highly-developed compact single-cylinder low-noise diesel engine with a low weight. The engine is easily started either with electric starter and recoil starter or with recoil starter only. (Recoil starter = Manual rope starting).

SA50-T meets the "E" requirements of the Danish Maritime Authority.

SA50-T is a quality product in accordance with ISO 9001.

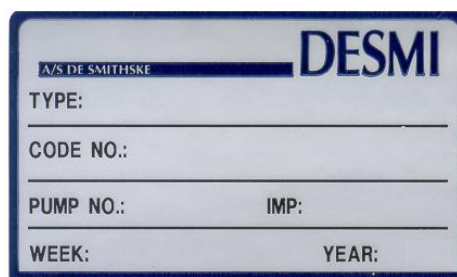
### 1.2 NAME PLATE

Manufacturer:  
DESMI A/S  
DK - 9400 Nørresundby  
Tel.: +45 9632 8111  
Fax: +45 9817 5499

TYPE: ..... Pump type  
CODE NO.: ... Pump code  
PUMP NO.: ... Pump No.  
IMP: ..... Impeller diameter  
WEEK: ..... Production week  
YEAR: ..... Production year

Made in Denmark

CE-mark



All SA50-T pumps are equipped with a name plate, and the type designation indicates suction branch diameter, standard impeller diameter, height of the impeller blades, and engine type.

## 1.2.1 TYPE DESCRIPTION

TYPE: SA50-T (50-135/14) HATZ 1B20/30

SA50-T: DESMI pump with engine  
50: Suction branch diameter  
135: Standard impeller diameter  
14: Height of the impeller blades  
HATZ 1B20/30: HATZ engine type 1B20 or 1B30

### 1.3 EC DECLARATION OF CONFORMITY

DESMI A/S, hereby declare that our pumps of the SA50-T type are manufactured in conformity with the following essential safety and health requirements in the COUNCIL DIRECTIVE 2006/42/EC on machines, Annex 1.

The following harmonized standards have been used:

EN 294:1994	Safety of machinery. Safety distances to prevent danger zones being reached by the upper limbs
EN 809 + A1	Pumps and pump units for liquids – Common safety requirements
EN 12162:2001	Liquid pumps – Safety requirements – Procedure for hydrostatic testing
EN 60204-1:2006	Safety of machinery – Electrical equipment of machines (item 4, General requirements)

Pumps delivered by us connected with prime movers are CE-marked and comply with the above requirements.

Pumps delivered by us without prime movers (as partly completed machinery) must only be used when the prime mover and the connection between prime mover and pump comply with the above requirements.

Nørresundby, June 1, 2010



Kurt Bech Christensen  
Technical Director

DESMI A/S  
Tagholm 1  
9400 Nørresundby

## 2. WARNINGS



At installations pumping hot or very cold liquids, the operator must be aware that it is dangerous to touch the pump surface and, consequently, he must take the necessary safety measures.



Before dismantling the pump make sure that it has stopped. Empty the pump of liquid before it is dismantled from the piping system. If the pump has been pumping dangerous liquids you are to be aware of this and take the necessary safety measures. If the pump has been pumping hot liquids, take great care that it is drained before it is removed from the piping system.



For safety reasons the pump is only allowed to operate against a closed discharge valve for a short time (max. 2 minutes). To protect the pump against unintentional operation it is equipped with a relief valve which opens at a preset pressure (6.0 bar).

Be careful: When the valve opens, the temperature of the escaping liquid may have been elevated.

The relief valve must in **no** circumstances be removed or re-adjusted !

As regards maintenance of the relief valve - see paragraph 3.3

## 3. OPERATION

### 3.1. START-UP



A self-priming centrifugal pump will not function until the pump casing has been filled with liquid. Remove the plug at the top of the pump casing and fill the pump with cold liquid. Fit the plug and the pump is ready for service

The liquid also serves as coolant for the shaft seal. Consequently, the pump must in no circumstances be started before it has been primed with liquid. Furthermore, the pump must never run dry.

#### 3.1.1 STARTING

Before starting the pump check that

- the shaft rotates freely without jarring sounds (pull the starting rope carefully)
- the pump casing is filled with liquid.

### 3.2 SYSTEM BALANCING

It is often difficult to calculate a manometric delivery head in advance. It is, however, decisively important to the quantity of liquid delivered.

A considerably smaller delivery head than expected will increase the quantity of liquid delivered, causing increased power consumption and perhaps cavitation in pump and piping. In the pump the impeller may show signs of heavy erosion caused by cavitation (corrosion) which may at times render an impeller unfit for use in a very short time. Not unusually do similar erosions occur in pipe bends and valves elsewhere in the piping system.

Therefore, after start-up, it is necessary to check either the quantity of liquid delivered or to read the differential pressure, as the quantity of liquid can then be determined against the characteristics of the pump.

Should the pump not function as intended, please proceed according to the fault-finding list. Bear in mind, though, that the pump was carefully checked and tested at the factory and that the majority of faults stem from the piping system.

FAULT	CAUSE	REMEDY
The pump does not prime	<ol style="list-style-type: none"> <li>1. The pump is not filled with liquid</li> <li>2. Leaking clack valve in pump</li> <li>3. Air is drawn in because of too little liquid or leaking suction line</li> <li>4. Liquid lock in outlet line</li> <li>6. Temperature of liquid too high</li> <li>7. Air cannot escape on pressure side</li> </ol>	<p>Fill pump casing with liquid Remove foreign body in pump/Remove any coating on mating faces Lower suction pipe/ Tighten suction line</p> <p>Change the pressure line so that the air can pass out freely Replace liquid in pump casing/Wrong dimensioning/Contact DESMI Ventilate the system</p>
The pump has no or too low capacity	<ol style="list-style-type: none"> <li>1. Piping system choked</li> <li>2. The pump is choked</li> <li>3. Suction line leaks, pump takes air</li> <li>4. Suction lift too high</li> <li>5. Pump and piping system wrongly dimensioned</li> </ol>	<p>Clean or replace Clean the pump Find the leakage/repair the fault/clack valve not submerged Check data sheet Q/H curve and NPSH or contact DESMI As 4</p>
The pump uses too much power	<ol style="list-style-type: none"> <li>1. Counter-pressure too low</li> <li>2. The liquid is heavier than water</li> <li>3. Foreign body in pump</li> </ol>	<p>Insert orifice plate or check valve/Contact DESMI Contact DESMI</p> <p>Dismantle the pump, remove the cause</p>
The pump makes noise	<ol style="list-style-type: none"> <li>1. Cavitation in pump</li> <li>2. Foreign body in pump</li> </ol>	<p>Suction lift too high/ Suction line wrongly dimensioned/Liquid temperature too high Dismantle the pump, remove the cause</p>

### 3.3 INSPECTION AND MAINTENANCE

- Before any inspection of the pump, check that the unit cannot be started unintentionally.
- The system is to be without pressure and drained of liquid.
- The repairman must be familiar with the type of liquid which has been pumped as well as with the safety measures he is to take when handling the liquid.
- Inspect the shaft seal for leaks at regular intervals.
- Activate the relief valve at regular intervals in order to check the function. If the valve is choked, replace or clean it, if possible.

#### 3.3.1 DRAINING THE PUMP

When the piping system has been drained, note that there is still some liquid left in the pump. Remove the remaining liquid by dismantling the pipe plug (pos. 14) at the bottom of the pump.

### 3.4. FROST PROTECTION

Pumps which are not in operation during frost periods are to be drained to avoid frost damage. Remove the plug at the bottom to empty the pump. Alternatively, it is possible to use anti-freeze liquids in normal constructions.

### 3.5 NOISE LEVEL

The noise level indicated is the airborne noise including the engine.

Pump type	Distance 7 metres	Distance 1 metre
SA50-T HATZ 1B20	74dB(A)	87dB(A)
SA50-T HATZ 1B30	75dB(A)	88dB(A)

## 4. ASSEMBLING - REPAIR - DISMANTLING

### 4.1 FROM DELIVERY TO ASSEMBLING

#### 4.1.1 DELIVERY

- Check on receipt that the delivery is complete and undamaged.
- Defects and damages, if any, to be reported to the carrier and the supplier immediately in order that a claim can be advanced.

#### 4.1.2 TRANSPORT / STORAGE

Weight of pump - see paragraph 5.1.1

The pump is to be stored in a dry area.

Before shipment the pump is to be fastened securely on a pallet or the like.

SA50-T HATZ 1B20/30 is to be lifted in the following way:



Place the lifting straps cornerwise in such a way that the pump is in balance when lifted.

The lifting straps must not bear against sharp edges and corners.

#### 4.1.3 ASSEMBLING PUMP

The suction line to the pump is to be mounted carefully, so that it is absolutely tight, as even small leakages may impede the priming. When pumping polluted liquids a strainer is necessary. The strainer must be equipped with a sieve, the passage area of which is to be 3 x the area of the suction pipe. The mesh size is to be 1-3 mm smaller than the height of the impeller blades of the pump in question.

#### 4.1.4 INSTALLATION



At installations pumping hot or very cold liquids, the operator must be aware that it is dangerous to touch the pump surface and, consequently, he must take the necessary safety measures..

#### 4.2 DISMANTLING PUMP

##### 4.2.1 INSPECTION

When the pump has been dismantled, check the following parts for wear and damage:

- Wear plate/impeller: Max. clearance 0.4 - 0.6 mm.
- Shaft seal/intermediate piece: Check seat for flatness and cracks.  
Check rubber parts for elasticity.

#### 4.3 ASSEMBLING PARTS IN THE PUMP

##### 4.3.1 FITTING INTERMEDIATE PIECE

Fit the intermediate piece on the engine.

##### 4.3.2 FITTING SHAFT

Screw the pump shaft direct on the diesel engine shaft until it bears against the taper of the pump shaft.

When the pump has been assembled, check that the shaft rotates freely.

##### 4.3.3 FITTING SHAFT SEAL

Before fitting the seat, clean the recess in the intermediate piece. When fitting the seat, remove the protective coating without scratching the lapped surface. Dip the outer rubber ring of the seat in olive oil (or another acid-free oil). Now press the seat into place with the fingers, and check that all parts are correctly imbedded.

If it is necessary to use fitting tools, then protect the sliding surface of the seat to prevent it from being scratched or cut. Lubricate the inner diameter of the rubber bellows on the slide ring with olive oil and push it over the shaft.

The use of a fitting bush is recommended to avoid that the rubber bellows is cut. Push the slide ring over the shaft with the hand. If the rubber bellows is tight, use a fitting tool and take care that the slide ring is not damaged. If the carbon ring is not fixed, it is important to check that it is fitted correctly, i.e. the chamfered/lapped side is to face the seat. The carbon ring can be held by a little grease. When using oil on the shaft, the bellows will settle and seat in about 15 minutes and until then tightness should not be expected.

After start, check by viewing the leak hole that there are no leaks.

If the pump is equipped with a shaft seal type different from a rubber bellows seal, contact DESMI and ask for an installation instruction.

#### 4.3.4 FITTING IMPELLER

Fit the sunk key in the shaft and lead the impeller towards the shoulder of the shaft. Take care that the ring at the end of the shaft seal spring locates in the recess of the impeller. Secure the impeller with a washer and a nut. Check that the axial distance between impeller and pump casing is between 0.4 and 0.6 mm. Adjust with shims (pos. 9) between pump casing and intermediate piece, if necessary.

### 4.4 REPAIR

#### 4.4.1 ORDERING SPARE PARTS

When ordering spare parts please always state pump type and pump No. (appears on the name plate of the pump). See also spare parts drawing with item Nos.

#### 4.5 DISMANTLING



Before dismantling the pump make sure that it has stopped. Empty the pump of liquid before it is dismantled from the piping system. If the pump has been pumping dangerous liquids you are to be aware of this and take the necessary safety measures.

If the pump has been pumping hot liquids, take great care that it is drained before it is removed from the piping system.

### 5. TECHNICAL SPECIFICATION

#### 5.1 PUMP

##### 5.1.1 WEIGHT OF PUMP

The weight of the pump (material combination AlMg4 casing and St.18/8 impeller) with engine and frame.

Pump	Weight incl. liquid	Weight excl. liquid
SA50-T HATZ 1B20 with recoil starter	57 kg	50 kg
SA50-T HATZ 1B20 with electric and recoil starter	65 kg	58 kg
SA50-T HATZ 1B30 with recoil starter	64 kg	55 kg
SA50-T HATZ 1B30 with electric and recoil starter	72 kg	63 kg

## 5.2 ENGINE

### 5.2.1 ENGINE IN GENERAL

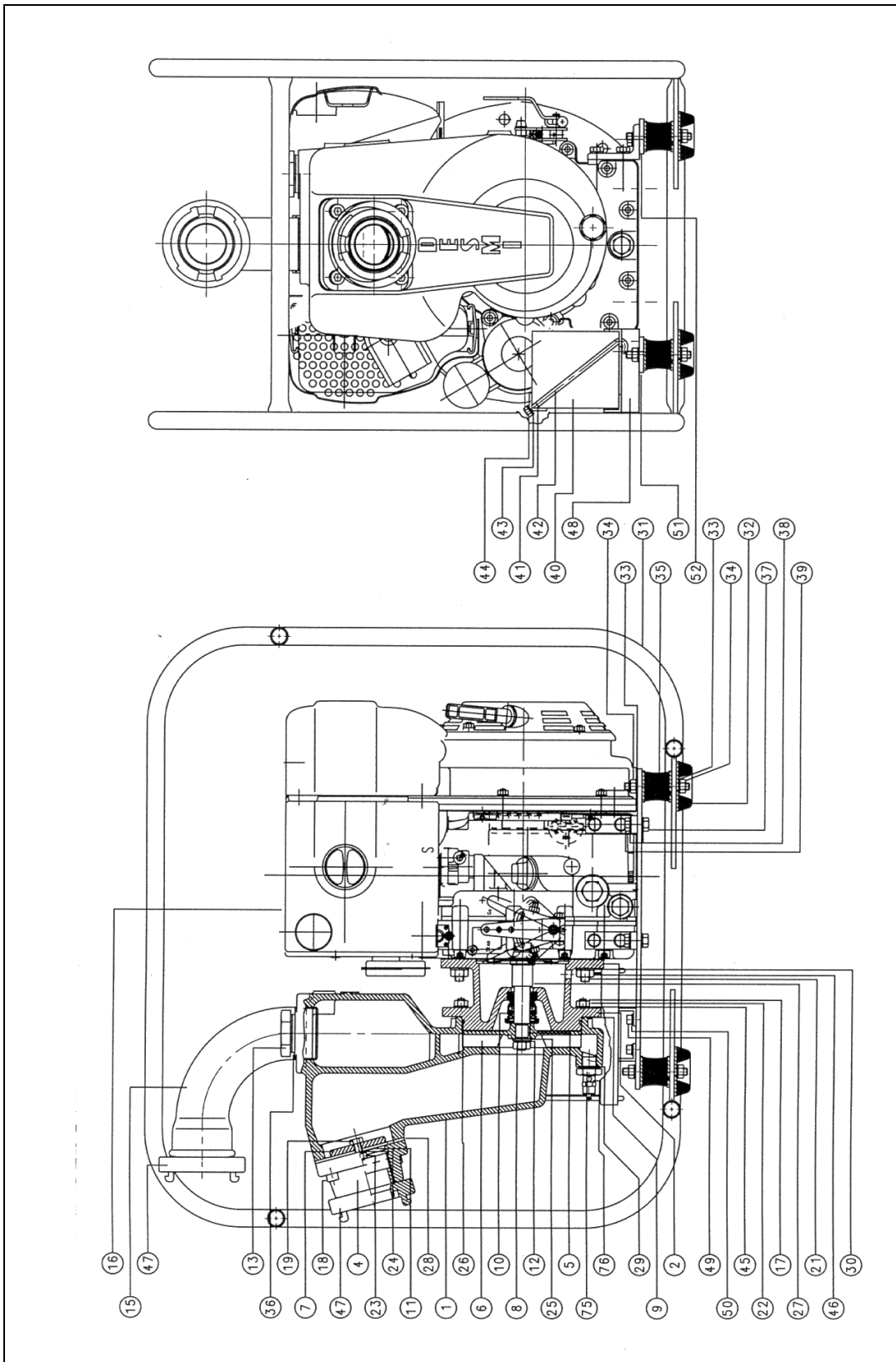
See engine manual.

### 5.3 OPERATING DATA

The max. rpm of SA50-T is 3600.

Max operating pressure = 4 bar

## 5.4 ASSEMBLY DRAWING – TYPICAL



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## 5.4.1 SPARE PARTS LIST - TYPICAL

Designation:	Pos.:
Pump casing	01
Intermediate piece	02
Suction branch	04
Sunk key	05
Impeller	06
Clack valve plate	07
Nut	08
Shim	09
Shaft seal	10
Clamp plate	11
Centre spring washer	12
Pipe plug	13
Pipe plug	14
Bend	15
Diesel engine Hatz	16
Stud	17
Screw	18
Set screw	19
Stud	21
Nut	22
Nut	23
Lock washer	24
Washer	25
O-Ring	26
Shaft	27
Clack valve	28
Sealing washer	29
Washer	30
Frame	31
Base	32
Centre spring washer	33
Nut	34
Vibration damper	35
Sealing washer	36
Nut	37
Centre spring washer	38
Set screw	39
Starting battery	40*)
Frame for battery	41*)
Battery retainer	42*)
Washer	43*)
Locking nut	44*)
Washer	45
Nut	46
Storz coupling	47
Frame for battery	48*)
Screw	49*)
Centre spring washer	50*)
Plate	51
Plate	52

\*) Only apply to pumps with electric starting

5.5 DIMENSIONAL SKETCH – TYPICAL

