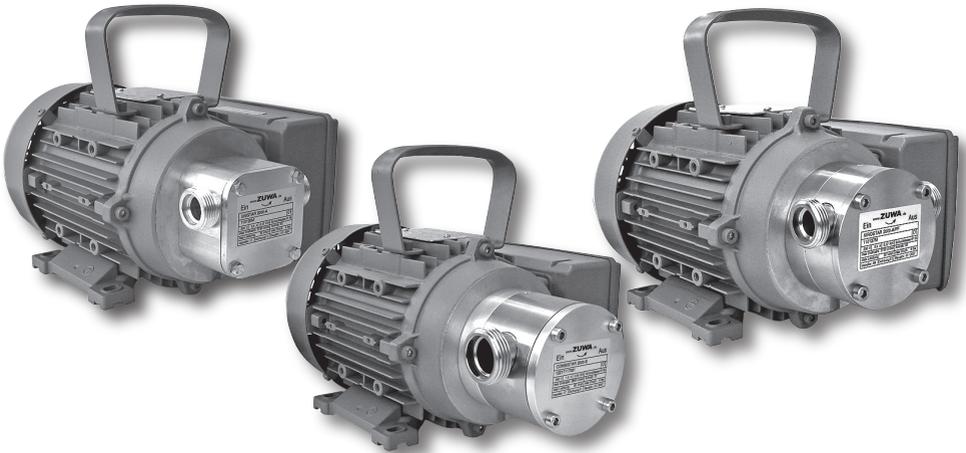
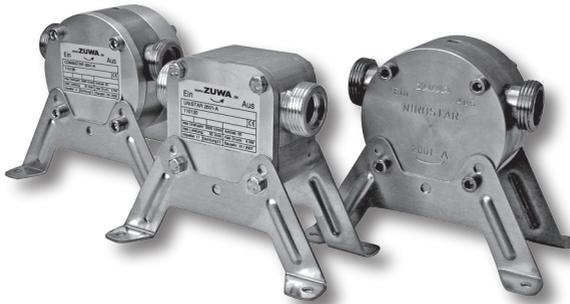




# ZUWA-Zumpe GmbH

Pumps and Sprayers

## Operating Instructions Flexible Impeller Pumps



UNISTAR • COMBISTAR • NIROSTAR



# ZUWA Impeller Pumps

## Operating Instructions (Translation)

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# Declaration of conformity

according to machinery directive 2006/42/EC annex II A

The manufacturer **ZUWA-Zumpe GmbH**  
**Franz-Fuchs-Straße 13-17**  
**D-83410 Laufen**

hereby declares that the following products

product name: **Impeller Pumps**

types: **UNISTAR 2000-A; UNISTAR 2000-B; UNISTAR 2000-C**  
**COMBISTAR 2000-A; COMBISTAR 2000-B**  
**NIROSTAR 2000-A; NIROSTAR 2000-B**

series: **Impeller Pumps with motor**

comply with the provisions of the above-mentioned CE Directive(s) including the amendments valid at the time of declaration.

The following harmonised standards have been applied:

EN 1005-1:2001-10 Safety of machinery - Human physical performance - Part 1: Terms and definitions

EN 1005-2:2003-04 Safety of machinery - Human physical performance - Part 2: Manual handling of machinery and component parts of machinery

EN 809:1998-07 Pumps and pump units for liquids - Common safety requirements

The following harmonised and national standards and technical specifications have been applied:

EMC directive 2004/108/EC  
Low Voltage Directive 2006/95/EC

Person authorized for the compilation of the technical documentation:

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Ort: 83410 Laufen  
Datum: 08.02.2010

  
(Unterschrift)  
Geschäftsführer

  
(Unterschrift)  
Leitung Technik

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# 1. Introduction

These operating instructions apply for the following pump types:

**with motor**

- UNISTAR 2000-A
- UNISTAR 2000-B
- UNISTAR 2000-C
- COMBISTAR 2000-A
- COMBISTAR 2000-B
- NIROSTAR 2000-A
- NIROSTAR 2000-B

**without motor**

- UNISTAR 2001-A
- UNISTAR 2001-B
- UNISTAR 2001-C
- COMBISTAR 2001-A
- COMBISTAR 2001-B
- NIROSTAR 2001-A
- NIROSTAR 2001-B

The manual is intended for all users of the ZUWA impeller pumps which are listed here.

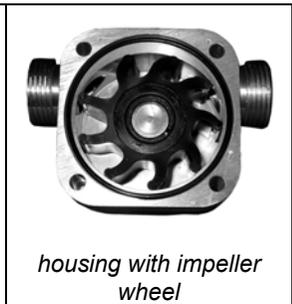
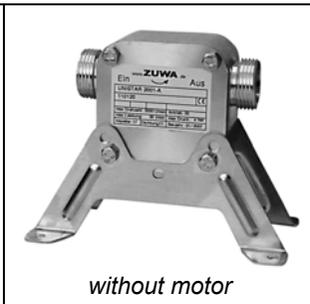
## 1.1 Further applicable documents

- Parts list with exploded drawings

## 1.2 Machine Specifications

All of the pumps are available in the following designs:

- as a complete unit with electric motor, coupling and coupling protection (series 2000)
- without motor and with bare shaft (series 2001)



The pumps are dry self-priming down to a depth of 3 metres.

## 2. Safety

### 2.1 Intended use

The pumps are designed for dry-well installation. Make sure that the motor remains dry (protection class IP 55).

#### Pump types

<b>UNISTAR</b>	Multi-purpose pump with aluminium casing designed for transporting clean or contaminated fluids not containing abrasive substances.. Not suitable for handling foods and abrasive or corrosive fluids.
<b>COMBISTAR</b>	Pump made from stainless steel (all parts which come into contact with the liquid) and aluminium (cover), also suitable for abrasive or slightly corrosive liquids. Not suitable for foods.
<b>NIROSTAR</b>	Stainless steel pump that is particularly suitable for corrosive and abrasive liquids, as well as for food and drinks.

### 2.2 Important safety instructions



The manufacturer shall not be held liable for damage resulting from non-adherence to the operating instructions.

- Store these instructions in such a way that they are accessible at all times for pump operating personnel. Urge employees to read and follow these instructions. Do not remove adhesive labels showing technical information.
- Observe plant-related specifications and provisions.
- Have work carried out by specialist personnel or personnel briefed according to the VDE standard.
- Only carry out work on the pump when the pump is not in operation and the drive has been disconnected from the mains power supply.
- In case of dangerous (e.g. hot, poisonous, explosive) pumped media, use protective equipment.
- Do not pump any liquids that are corrosive to the pump material.
- Do not pump any liquids containing particles of diameter greater than 2 mm.
- Do not use pumps under water.
- Do not allow pumps to run without liquid for longer than one minute.
- Only use genuine replacement parts, otherwise the warranty shall cease to be valid.

## 2.3 Legend

	<b>Danger of death and severe injury</b>
	<b>Danger of death and severe injury due to electric shock</b>
	<b>Danger of light bodily injuries and material damage</b>
	<b>Information, note</b>

### 3. Technical data

	UNISTAR 2000-A	UNISTAR 2001-A	UNISTAR 2000-B	UNISTAR 2001-B	UNISTAR 2000-C	UNISTAR 2001-C	COMBISTAR 2000-A	COMBISTAR 2001-A	COMBISTAR 2000-B	COMBISTAR 2001-B	NIROSTAR 2000-A	NIROSTAR 2001-A	NIROSTAR 2000-B	NIROSTAR 2001-B
max. flow rate in L/min	30	30	60	60	90	90	30	30	60	60	30	30	60	60
max. pressure in bar (with Perbunan impeller)	5	4	5	4	5	4	5	4	5	4	5	4	5	4
connections In/Out external thread (inches and nominal width in mm)	$\frac{3}{4}$ " 19	$\frac{3}{4}$ " 19	1" 25	1" 25	$1\frac{1}{4}$ " 32	$1\frac{1}{4}$ " 32	$\frac{3}{4}$ " 19	$\frac{3}{4}$ " 19	1" 25	1" 25	$\frac{3}{4}$ " 19	$\frac{3}{4}$ " 19	1" 25	1" 25
max. speed	12 or 24-Volt motors: 3000 rpm 230- or 400-Volt motors: 2800 rpm													
motor protection class	IP 55													
max. temperature	90°C (with plastic impeller 60°C)													
max. suction height	7 metres (dry 3 metres)													
maximum viscosity of the fluid	20.000 mPas													
sound pressure level	74 dB(A)													

### 3.1 Type plate

Type plate, example:

<b>UNISTAR 2000-A</b>			
110120M			<b>CE</b>
230 V	3,4 A	0,37 KW	Schutzklasse: IP 55
max Drehzahl: 2730 U/min		Antrieb: 63	
max Leistung: 30 l/min		max Druck: 4 bar	
Impeller: 17	Dichtung: 11	Baujahr: 01 / 2007	

<p><b>Impeller</b> (1st. digit)</p> <p>1 → NBR 2 → EPDM 3 → FKM 4 → CR 5 → VQM 6 → aluminium 7 → brass 8 → stainless steel 9 → plastics</p>	<p><b>Sleeve</b> (2nd digit)</p> <p>1 → plastics 2 → 3 → 4 → 5 → 6 → aluminium 7 → brass 8 → stainless steel</p>
---	--

<p><b>Drive:</b></p> <p>00 → without motor, bare shaft end 01 → double bearing with V-belt drive 02 → hydraulic drive 03 → pneumatic motor  14 → DC 12 V 24 → DC 24 V 34 → DC 48 V  61 → electr. motor 110 V / 50 HZ special shaft 62 → electr. motor 110 V / 60 HZ special shaft 63 → electr. motor 230 V with special shaft 64 → electr. motor 230 V with standard shaft 73 → electr. motor 400 V with special shaft 74 → electr. motor 400 V with standard shaft</p>
---

<p><b>Seal type</b> (1st. digit)</p> <p>1 → Shaft gasket 2 → Slide ring seal</p>	<p><b>Seal material</b> (2nd digit)</p> <p>Shaft gasket: 1 → NBR 2 → EPDM 3 → FKM 4 → CR 5 → VQM  Slide ring seal: 1 → Stainless steel-graphite-NBR 2 → Tungsten-carbide-NBR</p>
--	--

### 3.2 Impeller materials

Impeller pumps are equipped with NBR impellers as standard.

Material designation	Suitable for:	Properties
<b>NBR</b> Acrylonitrile butadiene rubber (Perbunan®, Buna-N®)	water, antifreeze, heat transfer fluid, vegetable oil and grease	high impact elasticity and good mechanical strength good for applications involving high pressures up to max. 5 bar
<b>EPDM</b> Ethylene propylene diene rubber (Keltan®, Buna EP®)	high temperatures, acids and alkalis	high elasticity and very good mechanical stability
<b>FKM or FPM</b> Fluorocarbon rubber (Viton®, Fluorel®)	oil, diesel, fuel oil, palm oil, soy bean oil and oleaginous wood preservatives	very good chemical resistance, low mechanical strength
<b>CR</b> Chloroprene rubber (Neoprene®, Bayprene®)	food, drinks	flame resistant, tearproof, durable
<b>plastic</b>	water, mineral and vegetable oils, diesel, heat transfer fluid, antifreeze	extremely tear resistant and good mechanical stability max. fluid temperature 60°C

### 4. Transportation and unpacking

- > After unpacking, immediately check the pump for completeness and damage.
- > Immediately report any transit damage to the supplying company.
- > Dispose of packaging material according to the respective local regulations.

### 5. Mounting



**Danger**

#### **Danger of death due to electric shock**

- > Work on the electrics may only be carried out by specialist personnel.



**Danger**

#### **Danger of injury from rotating components**

- > Cover drive and pump shaft.



**Material damage due to overheating of engine**

**Caution** > Ensure sufficient space and air supply for the motor.

---



The pump can be fitted vertically or horizontally. In case of vertical fitting, it is advantageous to direct the pump head downwards, so that in case of leaking the motor is protected against escaping liquid.

## 5.1 Connection of hoses or pipes



Hoses or lines must be suitable for the respective pumped medium. Avoid long suction lines.

Observe correct direction of rotation of pump, indicated by an arrow on the type plate and the lettering In – Out.

Affix hoses as follows:

1. Screw suction line onto the side marked “In”.
2. Screw pressure line onto the side marked “Out”.
3. Verify that the connections are leaktight.



In the case of a suction height of more than 3 metres, fit foot valve in the suction line in order to prevent drainage of the pump and suction line.

## 6. Electrical connection

### 6.1 Series 2000-A, 2000-B and 2000-C

---



**Danger of death due to electric shock**

- Danger**
- > Fit the pump's electric circuit with a ground fault circuit interrupter.
  - > Fit a motor overload switch.
- 

**230 Volt motors:**

Thermal protection is fitted. Fitting of a motor overload switch is advisable.

**400 Volt motors:**

No thermal protection is fitted. Fitting of a motor overload switch is required (available as accessory)

**Direct current motors:**

Protection against overcurrent by means of safety fuses:

- 12 Volt motors: 80-A
- 24 Volt motors: 50-A



**Motor damage can arise due to unsuitable extension cable**

- > For extension cables of length up to 20 metres: Use cables with at least the same cross section as the pump cable.
- > For extension cables with a length of more than 20 metres: Use cables with a larger cross section than the pump cable.

## 6.2 Series 2001-A, 2001-B and 2001-C

The pumps can, for example, be driven with the following drive systems:

- power drill
- V-belt drive
- gear motor
- hydraulic motor
- pneumatic motor



When using external drive systems, observe the manufacturer's instructions.

Ensure correct speed and output of the drive system:

- Max. speed 3000 rpm
- Minimum output of the drive system:
  - 370 Watt for types of series 2001-A
  - 550 Watt for types of series 2001-B
  - 1100 Watt for types of series 2001-C

Impeller pumps require an increased starting torque.



For pumps with three-phase motor, observe the direction of rotation of the motor. The direction of rotation is indicated by an arrow on the type plate.



### 6.2.1 Operation with hand drill or cordless screwdriver

The pump needs to be fixed when it is used with a hand drill or any other electric drill to avoid turning.

Fixation can be done in two ways:

#### A) with drill adapter

The adapter either comes with the pump or can be ordered separately from the manufacturer. The adapter is suitable for any standard drills and screwdrivers. Article No. adapter: 11012300

- > Fix adapter on pump (see below).
- > Insert pump shaft into chuck and tighten.
- > Insert depth stop into upper aperture and tighten fixing screw.



#### B) with mounting feet and regraded support

Mounting feet and support can be ordered directly from the manufacturer.

Article No. mounting feet: 110 127 10

Article No. regraded support: 110 123 10

The support needs to be suitable for the drill. The grading has to be high enough to provide for a precisely horizontal alignment of drill and pump

- > Fix mounting feet on top of the support.
- > Insert pump shaft into chuck. Pump and drill must be precisely aligned. Tighten chuck.



#### Material damage due to pressure on the shaft

- > Do not affix the drill to the support, but allow it to lie loosely in such a way that it has some play.
-

### 6.2.2 Using other drive systems

If an external drive is being used, a **claw coupling** with adapter for the connection of the pump with the motor (optional accessories, see parts list from item 200) is necessary.



#### Material damage due to incorrect alignment of the pump

- > If the claw coupling is being used, ensure precise alignment of the pump and motor, to prevent the shaft from breaking. The claw coupling can only compensate a degree of play of 0.1 mm.

## 7. Commissioning and operation



**Danger**

#### Danger of death due to explosion

- > Do not pump any liquids with a flash point of less than 55 ° C.
- > Do not pump petrol or solvents.



**Danger**

#### Danger of death and injury due to rotating parts

- > Do not touch pump while it is in operation.



**Danger**

#### Danger of injury due to items of clothing and hair being caught in the running drive

- > Do not wear loose items of clothing such as ties, scarves and shawls.
- > Tie back long hair and protect using a head covering or hood.



**Warning**

#### Danger of injury and poisoning due to dangerous pumped media

- > Safely collect escaping pumped media and dispose of in an environmentally-friendly manner.



#### Material damage due to high temperatures of the pumped medium

- > Do not pump liquids with a temperature of more than 90 °C, otherwise the impeller material will become attacked.



ZUWA impeller pumps are dry self-priming. It is not necessary to fill the pumps prior to commissioning except when the suction depth is more than 3 metres.



### Material damage due to dry running

- > In case of a suction depth of more than 3 metres, fill prior to commissioning.
  - > Never allow the pump to run dry for more than one minute.
- 

- > Open pressure line.
  - > To start the pump, switch on drive.
  - > Service interruption: wait 3 - 4 seconds before restarting
- 



### Material damage due to overpressure in the pump

- > Do not block pressure side for more than a minute while the drive is running.
- 

All ZUWA impeller pumps are suitable for continuous operation.



After extended periods of pump down time prior to commissioning, check that the impeller wheel runs freely and that the pump starts. See also chapter 11: "Troubleshooting".



*rotary switch*

### UNISTAR 2000-C

This pump is equipped with a rotary switch to change operating direction.

- > Prior to changing the rotating direction turn off pump and wait for 3 - 4 seconds. Then turn switch into the new direction.

## 8. Storage

- > Empty pump completely
- > Clean pump in order to avoid adhesions and damage to the impeller
- > Store pump under frost-protected conditions

---

## 9. Maintenance

---



### **Danger of death due to electric shock**

- > Prior to work on the pump, always disconnect the drive from the power supply.
- 

### 9.1 Routine inspection

- > Regularly check the line connections for leak-tightness

### 9.2 Cleaning

---



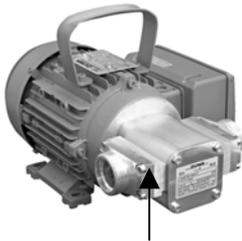
### **Material damage due to aggressive cleaning agents**

- > Do not use cleaning agents that affect the materials of pump or impeller wheel.
- 

### 9.3 Disassembling the pump



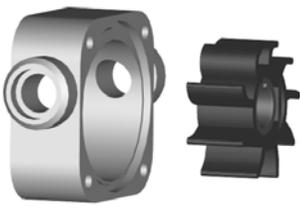
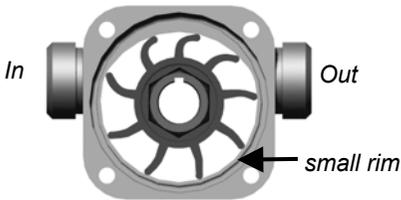
The pumps of the NIROSTAR series are not fitted with lateral discs.



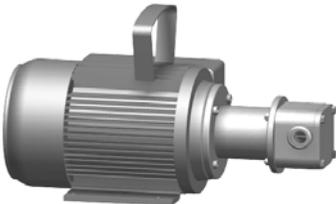
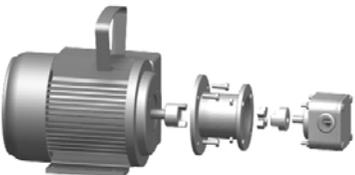
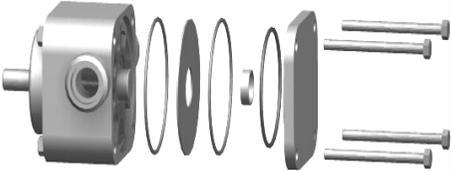
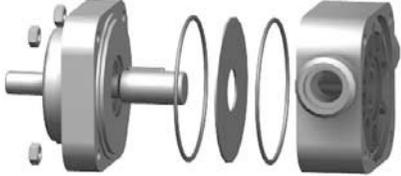
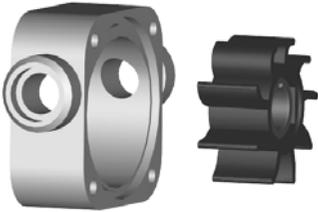
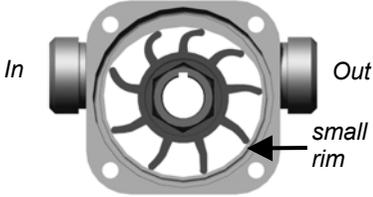
*lateral connection flange*

In addition to the disassembling as described on the following pages the lateral connection flanges can be dismantled from pumps of the 2000-C and 2001-C series.

**9.3.1 Series 2000-A, 2000-B and 2000-C directly flanged**

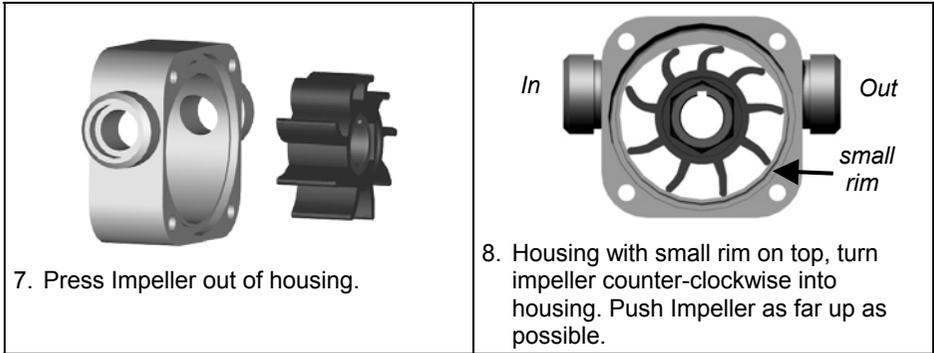
 <p>1. Disconnect hose connections.</p>	 <p>2. Release screws, remove cover.</p>
 <p>3. Remove lateral disc (without hole) and O-ring.</p>	 <p>4. Remove housing with impeller.</p>
 <p>5. Remove O-ring, lateral disc (with hole) and rear cover. Detach locking ring and press out shaft seal.</p>	 <p>6. Press Impeller out of housing.</p>
 <p><i>In</i> <i>Out</i> <i>small rim</i></p> <p>7. Housing with small rim on top, turn impeller counter-clockwise into housing. Push Impeller as far up as possible.</p>	

**9.3.2 Series 2000-A, 2000-B and 2000-C with pump adapter**

 <p>1. Disconnect hose connections.</p>	 <p>2. Release bolts and nuts, remove pump head from pump carrier.</p>
 <p>3. Release bolts, remove cover, O-rings and lateral disc (with hole).</p>	 <p>4. Remove housing with impeller, O-rings and lateral disc (with hole).</p>
 <p>5. Detach locking ring and press out shaft.</p>	 <p>6. Release safety rings and press out bearing respectively shaft seal ring.</p>
 <p>7. Push impeller out of housing.</p>	 <p>8. Housing with small rim on top, turn impeller counter-clockwise into housing. Push Impeller as far up as possible.</p>

**9.3.3 Series 2001-A, 2001-B and 2001-C**

 <p><i>with mounting feet</i></p>	 <p><i>with drill adapter</i></p>
<p>1. Disconnect line connections.</p>	
 <p><i>with mounting feet</i></p>	 <p><i>with drill adapter</i></p>
<p>2. Release bolts, remove mounting feet or adapter and cover.</p>	
 <p>3. Remove lateral disc (without hole) and housing with Impeller.</p>	 <p>4. Remove O-rings and lateral disc (with whole).</p>
 <p>5. Detach locking ring and press out shaft.</p>	 <p>6. Release locking rings and press out bearing respectively shaft seal ring.</p>

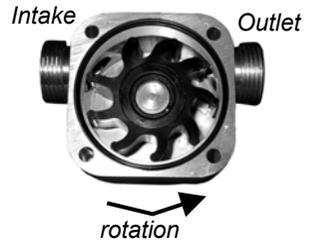


## 9.4 Replacing components

### Impeller

1. Push impeller out of the casing
2. Insert a new impeller. Observe direction of impeller vanes (see adjacent illustration): Impeller wings must be bent to the opposite side of the rotating direction.

To change the impeller more easily there is a tool. See chapter 10.4 tool for changing the impeller.



### Lateral discs

- > Turn around or replace

### Bush bearing

- > Remove old bearing and press in the new one.

### Seals

- Replace O-rings and push firmly into the recesses
- Replacing shaft gasket:
  1. Remove retaining ring with suitable pliers
  2. Push out bearing and shaft gasket
  3. Push in new shaft gasket and bearing
  4. Insert retaining rings

## 9.5 Assembling the pump

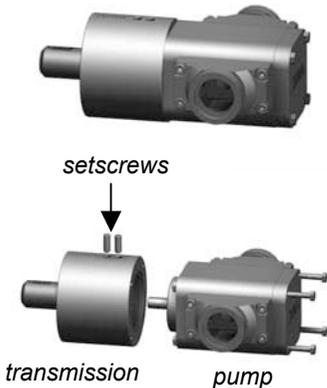
Assembly of the pump is the reverse of disassembly – see previous chapter.



The lateral discs and O-rings must lie precisely in the recesses to ensure that the O-rings are not pinched.

After completing pump assembly connect suction and pressure hose according to the indication In/Out on the type plate.

## 9.6 Mounting and dismounting of transmission for V-belt drive



The transmission with 24 mm stainless steel shaft for disc adaption can be used with pump types 2001-A, 2001-B and 2001-C. Pump with transmission is normally delivered as a completely assembled unit.

Separating pump from transmission:

- > First untighten 2 setscrews, then the 4 screws on the pump.
- > Pull off pump from transmission.

For reassembly first tighten the 4 screws on the pump, then the 2 setscrews.

## 10. Accessories

### 10.1 Dry run protection



*reset button*

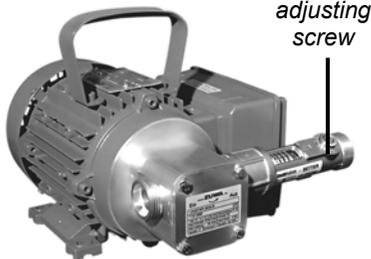
Dry run protection prevents overheating of the impeller. When the pump is running dry and heats up the thermo sensitive switch turns off the motor. After cooling off the pump is ready to use again.

- > To restart the cooled pump press the red reset button.

Observe the maximum temperature of the fluid when a dry run protection is used

- 60°C ±3K for UNISTAR and COMBISTAR
- 45°C ±3K for NIROSTAR A and B

### 10.2 Flow control



*adjusting screw*

With the flow control the flow rate of the pump can be controlled and adjusted to a specific quantity.

Flow rate measurement is based on the principle of a floater connected to a spring. The flow meter is integrated in the housing.

The flow rate can be adjusted with an adjusting screw:

- > Turn the adjusting screw using the scale from 1 - 6
- > Fine adjustment: turn the setting screw when pump is operating until the required flow rate is shown in the vision panel.

#### Technical data

flow rate:	2 – 8 L/min (for A-types)	8 -30 L/min (for A-types)	10 – 40 L/min (for B-types)
connecting thread:	2 x ¾" a	2 x 1" a	2 x 1" a
max. fluid temperature:	100°C		
max. working pressure:	10 bar		
material:	brass (approved for drinking water)		

### 10.3 Mechanical pressure switch



The pressure switch stops the pump once the preset pressure of 3 bar is reached (top switching point). When pressure reaches the lower switching point the pump will start automatically. Switch hysteresis is set to 30% as standard.

The top switching point can be adjusted with the adjusting screw located beneath the connector plug.

- > Remove connector plug and turn adjusting screw with a small screw driver:
  - turn right for higher pressure
  - turn left for lower pressure

Switch hysteresis can not be adjusted.



#### Technical data

switch pressure:	adjustable from 1 - 10 bar
switch current:	4 A
connecting thread:	1/4"
protection class:	IP 65 with plug
switch box:	stainless steel
membrane:	FKM as standard

### 10.4 Tool for changing the impeller

A useful tool to install the impeller easily into the casing, fitting for all ZUWA impellers.



## 11. Troubleshooting

Fault	Possible cause	Remedy
Pump does not take in liquid	intake line is not leaktight	seal connection or line
	impeller worn or damaged	replace impeller
	suction line or foot valve is blocked	clean suction line or foot valve
	pressure line closed or blocked	open fittings on the pressure side or clean pressure line
Pump does not build up pressure	impeller or lateral discs worn or damaged	replace impeller or lateral discs
Liquid escapes from the pump	shaft gasket or o-ring missing or defective	check whether part is in place and insert or replace defective component
Pump does not start	impeller blocked	fill pump with the medium to be pumped
	impeller clogged up or swollen	use an impeller appropriate to the medium
	motor defective	have motor checked by specialist personnel and have repaired if necessary

## 12. Environmentally compatible disposal

Most components of the device can be recycled. All metals (steel, aluminum, brass) can be disposed off at any scrap metal dealer.

Follow the locally applicable regulations.

Plastic parts can be contaminated by toxic pumped media, to the extent that cleaning is no longer an adequate solution.

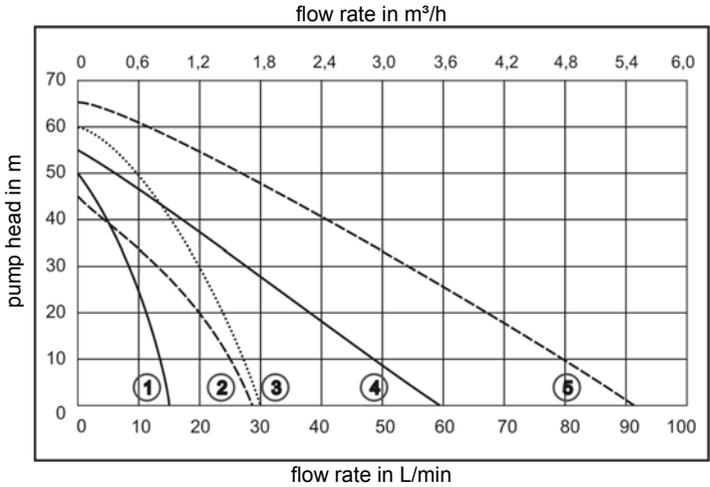


### Warning

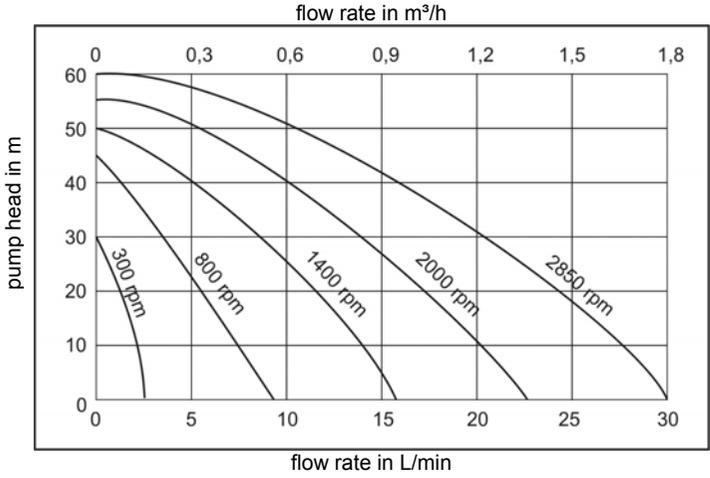
#### **Danger of injury and poisoning due to dangerous pumped media**

- > Collect escaping pumped media and dispose of according to the locally applicable regulations.
- > Neutralise residues of pumped media in the pump chamber.

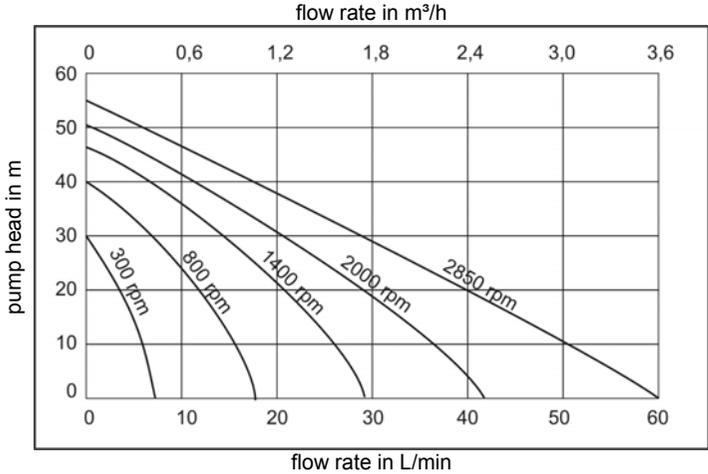
### 13. Performance curves



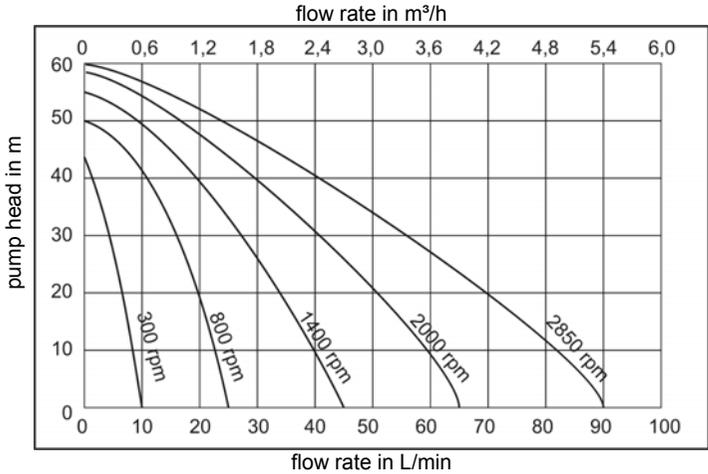
- 1) type A with 1.400 rpm
- 2) type B with 1.400 rpm
- 3) type A with 2.850 rpm
- 4) type B with 2.850 rpm
- 5) type C with 2.850 rpm



UNISTAR 2000-A with frequency converter



UNISTAR 2000-B  
with frequency  
converter



UNISTAR 2000-C  
with frequency  
converter