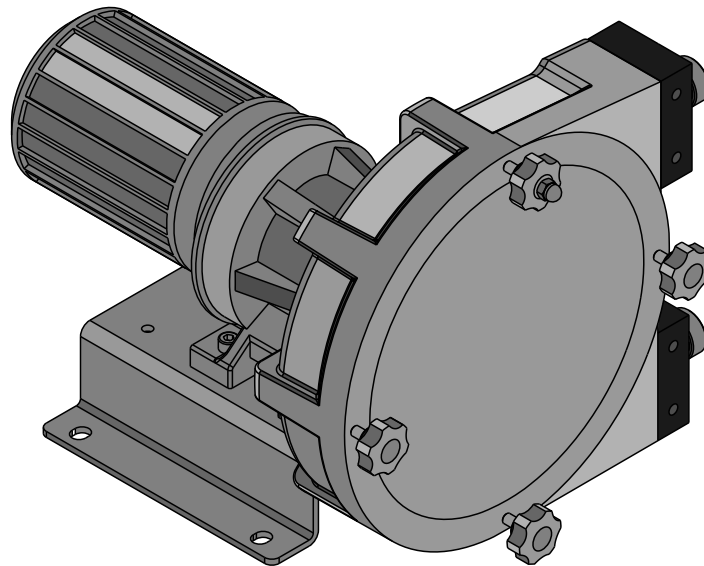


# Operating instructions

DULCO®flex DFBa

Peristaltic Pump



**Please carefully read these operating instructions before use! · Do not discard!  
The operator shall be liable for any damage caused by installation or operating errors!  
Technical changes reserved.**

ProMinent Dosiertechnik Heidelberg GmbH  
Im Schuhmachergewann 5 - 11  
69123 Heidelberg Germany  
Telephone: +49 6221 842-0  
Fax: +49 6221 842-419  
email: [info@prominent.de](mailto:info@prominent.de)  
Internet: [www.prominent.com](http://www.prominent.com)

986228, 1, en\_GB

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# 1 Introduction

These operating instructions provide information on the technical data and functions of the DULCOMETER® BFDa series peristaltic pump.

## 1.1 Explanation of the Safety Information

### Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed safety information and are provided as clear step-by-step instructions.

The safety information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



#### **DANGER!**

##### **Nature and source of the danger**

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

Danger!

- Denotes an immediate threatening danger. If this is disregarded, it will result in fatal or very serious injuries.



#### **WARNING!**

##### **Nature and source of the danger**

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

Warning!

- Denotes a possibly hazardous situation. If this is disregarded, it could result in fatal or very serious injuries.



#### **CAUTION!**

##### **Nature and source of the danger**

Possible consequence: Slight or minor injuries. Material damage.

Measure to be taken to avoid this danger.

Caution!

- Denotes a possibly hazardous situation. If this is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.

**NOTICE!****Nature and source of the danger**

Damage to the product or its surroundings.

Measure to be taken to avoid this danger.

**Note!**

- Denotes a possibly damaging situation. If this is disregarded, the product or an object in its vicinity could be damaged.

***Type of information***

*Hints on use and additional information.*

*Source of the information. Additional measures.*

*Information!*

- *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

## 1.2 Users' qualifications

**WARNING!**

**Danger of injury with inadequately qualified personnel!  
The operator of the plant / device is responsible for ensuring that the qualifications are fulfilled.**

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone

Training	Definition
Instructed personnel	An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.
Trained user	A trained user is a person who fulfils the requirements made of an instructed person and who has also received additional training specific to the system from ProMinent or another authorised distribution partner.
Trained qualified personnel	A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.

Training	Definition
Electrician	<p>Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on his/her technical training and experience, as well as knowledge of pertinent standards and regulations.</p> <p>Electricians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations.</p> <p>Electricians must comply with the provisions of the applicable statutory directives on accident prevention.</p>
Customer Service department	Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.



**Note for the system operator**

*The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to!*

### 1.3 ID Code

Device identification / Identcode

#### 1.3.1 Identcode DULCO®flex DFBa 010

Identcode	
DFBa	DULCO®flex DFBa 010
	Type
010	DFBa 010, 0.024 l/revolution
	Drive
000	Pump without drive
	Step-down gears / 3 x 230 / 400 VAC
A10	0.12 kW, 15 1/min, 21 l/h, 8 bar
A11	0.12 kW, 20 1/min, 28 l/h, 8 bar
A12	0.18 kW, 29 1/min, 41 l/h, 8 bar
A13	0.18 kW, 46 1/min, 66 l/h, 4 bar
A14	0.25 kW, 57 1/min, 82 l/h, 4 bar
A15	0.25 kW, 70 1/min, 100 l/h, 2 bar
A16	0.25 kW, 85 1/min, 122 l/h, 2 bar
	Manual adjustment gears / 3 x 230 / 400 VAC
A21	0.15 kW, 3-16 1/min, 4-23 l/h, 8 bar
A22	0.25 kW, 5-29 1/min, 7-41 l/h, 8 bar
A23	0.25 kW, 10-53 1/min, 14-76 l/h, 4 bar
A24	0.25 kW, 15-80 1/min, 21-115 l/h, 2 bar

Identcode	
DFBa	DULCO®flex DFBa 010
	Adjustment gears with integrated frequency converter / 1x 230 VAC
A31	0.37 kW, 9-34 1/min, 12-48 l/h, 8 bar
A32	0.37 kW, 16-60 1/min, 23-86 l/h, 4 bar
A33	0.37 kW, 28-105 1/min, 40-151 l/h, 1 bar
	Adjustment gears (external frequency converter required) / 3 x 230 / 400 VAC
A41	0.18 kW, 0-23 1/min, 0-33 l/h, 8 bar
A42	0.18 kW, 0-38 1/min, 0-54 l/h, 8 bar
A43	0.25 kW, 0-60 1/min, 0-86 l/h, 4 bar
A44	0.25 kW, 0-91 1/min, 0-131 l/h, 1 bar
	Hose material
0	NR
B	NBR
E	EPDM
R	NR-A
N	Norprene (max. 2 bar)
A	NBR-A
H	Hypalon
	Hydraulic connection
A	VA BSP 3/8"
B	VA NPT 3/8"
C	PP BSP 3/8"
D	PVDF BSP 3/8"
E	PVDF NPT 3/8"
F	PVC NPT 3/8"
G	Tri-Clamp, VA, 1/2"
H	DIN 11851, VA NW10
	Base plate
0	Base plate, lacquered steel
1	Base plate, stainless steel
2	Portable unit + lacquered steel base plate
3	Portable unit + stainless steel base plate
	Leakage sensor
0	without leakage sensor
L	with leakage sensor
	Rotor
0	Rotor with 2 rollers

Identcode										
DFBa	DULCO®flex DFBa 010									
										Batch control
									0	Without batch control
									C	With batch control
										Special version
									0	Standard
									H	Halar-coated housing
										Vacuum system
									0	none
										Certification
									01	CE mark

### 1.3.2 Identcode DULCO®flex DFBa 013

Identcode										
DFBa	DULCO®flex DFBa 013									
										Type
									013	DFBa 013, 0.039 l/revolution
										Drive
									000	Pump without drive
										Step-down gears / 3 x 230 / 400 VAC
									B10	0.12 kW, 15 1/min, 35 l/h, 8 bar
									B11	0.12 kW, 20 1/min, 46 l/h, 8 bar
									B12	0.18 kW, 29 1/min, 67 l/h, 8 bar
									B13	0.18 kW, 46 1/min, 107 l/h, 4 bar
									B14	0.25 kW, 57 1/min, 133 l/h, 4 bar
									B15	0.25 kW, 70 1/min, 163 l/h, 2 bar
									B16	0.25 kW, 85 1/min, 198 l/h, 2 bar
										Manual adjustment gears / 3 x 230 / 400 VAC
									B21	0.15 kW, 3-16 1/min, 7-37 l/h, 8 bar
									B22	0.25 kW, 5-29 1/min, 11-67 l/h, 8 bar
									B23	0.25 kW, 10-53 1/min, 23-124 l/h, 4 bar
									B24	0.25 kW, 15-80 1/min, 35-187 l/h, 2 bar
										Adjustment gears with integrated frequency converter / 1 x 230 VAC
									B31	0.37 kW, 9-34 1/min, 21-79 l/h, 8 bar
									B32	0.37 kW, 16-60 1/min, 37-140 l/h, 4 bar
									B33	0.37 kW, 28-105 1/min, 65-245 l/h, 1 bar

Identcode			
DFBa	DULCO®flex DFBa 013		
		Adjustment gears (external frequency converter required) / 3 x 230 / 400 VAC	
	B41	0.18 kW, 0-23 1/min, 0-53 l/h, 8 bar	
	B42	0.18 kW, 0-38 1/min, 0-88 l/h, 8 bar	
	B43	0.25 kW, 0-60 1/min, 0-140 l/h, 4 bar	
	B44	0.25 kW, 0-91 1/min, 0-212 l/h, 1 bar	
		Hose material	
	0	NR	
	B	NBR	
	E	EPDM	
	R	NR-A	
	N	Norprene (max. 2 bar)	
	A	NBR-A	
	H	Hypalon	
		Hydraulic connection	
	A	VA BSP 3/8"	
	B	VA NPT 3/8"	
	C	PP BSP 3/8"	
	D	PVDF BSP 3/8"	
	E	PVDF NPT 3/8"	
	F	PVC NPT 3/8"	
	G	Tri-Clamp, VA, 1/2"	
	H	DIN 11851, VA NW15	
		Base plate	
	0	Base plate, lacquered steel	
	1	Base plate, stainless steel	
	2	Portable unit + lacquered steel base plate	
	3	Portable unit + stainless steel base plate	
		Leakage sensor	
	0	without leakage sensor	
	L	with leakage sensor	
		Rotor	
	0	Rotor with 2 rollers	
		Batch control	
	0	Without batch control	
	C	With batch control	
		Special version	

Identcode										
DFBa	DULCO®flex DFBa 013									
									0	Standard
									H	Halar-coated housing
										Vacuum system
									0	none
										Certification
									01	CE mark

### 1.3.3 Identcode DULCO®flex DFBa 016

Identcode										
DFBa	DULCO®flex DFBa 016									
		Type								
	016	DFBa 016, 0.092 l/revolution								
		Drive								
		000	Pump without drive							
			Step-down gears / 3 x 230 / 400 VAC							
		C10	0.18 kW, 14 1/min, 77 l/h, 8 bar							
		C11	0.18 kW, 20 1/min, 110 l/h, 8 bar							
		C12	0.25 kW, 32 1/min, 176 l/h, 8 bar							
		C13	0.25 kW, 46 1/min, 253 l/h, 4 bar							
		C14	0.37 kW, 57 1/min, 314 l/h, 4 bar							
		C15	0.37 kW, 70 1/min, 386 l/h, 2 bar							
		C16	0.37 kW, 85 1/min, 469 l/h, 2 bar							
			Manual adjustment gears / 3 x 230 / 400 VAC							
		C21	0.37 kW, 8-50 1/min, 44-276 l/h, 4 bar							
		C22	0.37 kW, 10-61 1/min, 55-336 l/h, 2 bar							
		C23	0.37 kW, 16-91 1/min, 88-502 l/h, 1 bar							
			Adjustment gears with integrated frequency converter / 1 x 230 VAC							
		C31	0.37 kW, 9-34 1/min, 49-187 l/h, 8 bar							
		C32	0.37 kW, 16-60 1/min, 88-331 l/h, 2 bar							
		C33	0.37 kW, 28-105 1/min, 154-579 l/h, 1 bar							
			Adjustment gears (external frequency converter required) / 3 x 230 / 400 VAC							
		C41	0.25 kW, 0-23 1/min, 0-126 l/h, 8 bar							
		C42	0.25 kW, 0-42 1/min, 0-231 l/h, 4 bar							
		C43	0.37 kW, 0-60 1/min, 0-331 l/h, 2 bar							
		C44	0.37 kW, 0-91 1/min, 0-502 l/h, 1 bar							

Identcode			
DFBa	DULCO®flex DFBa 016		
			Hose material
		0	NR
		B	NBR
		E	EPDM
		R	NR-A
		N	Norprene (max. 2 bar)
		A	NBR-A
		H	Hypalon
		T	TYGON (max. 2 bar)
			Hydraulic connection
		A	VA BSP 3/4"
		B	VA NPT 3/4"
		C	PP BSP 3/4"
		D	PVDF BSP 3/4"
		E	PVDF NPT 3/4"
		F	PVC NPT 3/4"
		G	Tri-Clamp, VA, 1"
		H	DIN 11851, VA NW 20
			Base plate
		0	Base plate, lacquered steel
		1	Base plate, stainless steel
		2	Portable unit + lacquered steel base plate
		3	Portable unit + stainless steel base plate
			Leakage sensor
		0	without leakage sensor
		L	with leakage sensor
			Rotor
		0	Rotor with 2 rollers
			Batch control
		0	Without batch control
		C	With batch control
			Special version
		0	Standard
		H	Halar-coated housing
			Vacuum system
		0	none

Identcode											
DFBa	DULCO®flex DFBa 016										
											Certification
										01	CE mark

### 1.3.4 Identcode DULCO®flex DFBa 019

Identcode											
DFBa	DULCO®flex DFBa 019										
		Type									
	019	DFBa 019, 0.122 l/revolution									
		Drive									
		000	Pump without drive								
			Step-down gears / 3 x 230 / 400 VAC								
		D10	0.18 kW, 14 1/min, 102 l/h, 2 bar								
		D11	0.18 kW, 20 1/min, 146 l/h, 2 bar								
		D12	0.25 kW, 32 1/min, 234 l/h, 2 bar								
		D13	0.25 kW, 46 1/min, 336 l/h, 2 bar								
		D14	0.37 kW, 57 1/min, 417 l/h, 2 bar								
		D15	0.37 kW, 70 1/min, 512 l/h, 2 bar								
		D16	0.37 kW, 85 1/min, 622 l/h, 2 bar								
			Manual adjustment gears / 3 x 230 / 400 VAC								
		D21	0.37 kW, 8-50 1/min, 58-366 l/h, 2 bar								
		D22	0.37 kW, 10-61 1/min, 73-446 l/h, 2 bar								
		D23	0.37 kW, 16-91 1/min, 117-666 l/h, 2 bar								
			Adjustment gears with integrated frequency converter / 1 x 230 VAC								
		D31	0.37 kW, 9-34 1/min, 65-248 l/h, 8 bar								
		D32	0.37 kW, 16-60 1/min, 117-439 l/h, 2 bar								
		D33	0.37 kW, 28-105 1/min, 204-768 l/h, 1 bar								
			Adjustment gears (external frequency converter required) / 3 x 230 / 400 VAC								
		D41	0.25 kW, 0-23 1/min, 0-168 l/h, 2 bar								
		D42	0.25 kW, 0-42 1/min, 0-307 l/h, 2 bar								
		D43	0.37 kW, 0-60 1/min, 0-439 l/h, 2 bar								
		D44	0.37 kW, 0-91 1/min, 0-666 l/h, 2 bar								
			Hose material								
		0	Norprene (max. 2 bar)								
		T	TYGON (max. 2 bar)								
			Hydraulic connection								

Identcode										
DFBa	DULCO®flex DFBa 019									
				A	VA BSP 1"					
				B	VA NPT 1"					
				C	PP BSP 1"					
				D	PVDF BSP 1"					
				E	PVDF NPT 1"					
				F	PVC NPT 1"					
				G	Tri-Clamp, VA, 1"					
				H	DIN 11851, VA NW 25					
					Base plate					
				0	Base plate, lacquered steel					
				1	Base plate, stainless steel					
				2	Portable unit + lacquered steel base plate					
				3	Portable unit + stainless steel base plate					
					Leakage sensor					
				0	without leakage sensor					
				L	with leakage sensor					
					Rotor					
				0	Rotor with 2 rollers					
					Batch control					
				0	Without batch control					
				C	With batch control					
					Special version					
				0	Standard					
				H	Halar-coated housing					
					Vacuum system					
				0	none					
					Certification					
				01	CE mark					

### 1.3.5 Identcode DULCO®flex DFBa 022

Identcode									
DFBa	DULCO®flex DFBa 022								
		Type							
	022	DFBa 022, 0.248 l/revolution							
		Drive							

Identcode	
DFBa	DULCO®flex DFBa 022
	000 Pump without drive
	Step-down gears / 3 x 230 / 400 VAC
E10	0.25 kW, 17 1/min, 252 l/h, 8 bar
E11	0.37 kW, 23 1/min, 342 l/h, 8 bar
E12	0.55 kW, 38 1/min, 565 l/h, 4 bar
E13	0.55 kW, 45 1/min, 669 l/h, 4 bar
E14	0.55 kW, 54 1/min, 803 l/h, 2 bar
E15	0.75 kW, 66 1/min, 982 l/h, 2 bar
	Manual adjustment gears / 3 x 230 / 400 VAC
E21	0.37 kW, 3.9-20.4 1/min, 58-303 l/h, 8 bar
E22	0.55 kW, 6-32 1/min, 89-476 l/h, 4 bar
E23	0.75 kW, 9-48 1/min, 133-714 l/h, 2 bar
	Adjustment gears with integrated frequency converter / 1 x 230 VAC
E31	0.55 kW, 11-40 1/min, 163-595 l/h, 4 bar
E32	0.75 kW, 18-63 1/min, 267-937 l/h, 2 bar
E33	1.10 kW, 27-92 1/min, 401-1,368 l/h, 1 bar
	Adjustment gears (external frequency converter required) / 3 x 230 / 400 VAC
E41	0.55 kW, 0-29 1/min, 0-431 l/h, 8 bar
E42	0.75 kW, 0-38 1/min, 0-565 l/h, 4 bar
E43	1.10 kW, 0-54 1/min, 0-803 l/h, 2 bar
	Hose material
0	NR
B	NBR
E	EPDM
R	NR-A
N	Norprene (max. 2 bar)
A	NBR-A
H	Hypalon
	Hydraulic connection
A	VA BSP 1"
B	VA NPT 1"
C	PP BSP 1"
D	PVDF BSP 1"
E	PVDF NPT 1"
F	PVC NPT 1"
G	Tri-Clamp, VA, 1"

Identcode									
DFBa	DULCO®flex DFBa 022								
				H	DIN 11851, VA NW 25				
						Base plate			
					0	Base plate, lacquered steel			
					1	Base plate, stainless steel			
					2	Portable unit + lacquered steel base plate			
					3	Portable unit + stainless steel base plate			
						Leakage sensor			
					0	without leakage sensor			
					L	with leakage sensor			
						Rotor			
					0	Rotor with 2 rollers			
						Batch control			
					0	Without batch control			
					C	With batch control			
						Special version			
					0	Standard			
					H	Halar-coated housing			
						Vacuum system			
					0	none			
						Certification			
					01	CE mark			

## 2 Safety and responsibility

### 2.1 General safety information



#### **WARNING!**

##### **Live parts**

Possible consequence: Fatal or very serious injuries

- Measure: The device must be disconnected from the power supply before it is opened
- Isolate damaged, faulty or manipulated devices from the mains in order to de-energise.



#### **WARNING!**

##### **Emergency stop switch**

Possible consequence: Fatal or very serious injuries

An emergency stop switch is to be connected for the entire plant. This should enable the entire plant to be shut down in the event of an emergency in such a way that the overall plant can be brought into a safe condition.



#### **WARNING!**

##### **Unauthorised access**

Possible consequence: Fatal or very serious injuries

- Measure: Ensure that there can be no unauthorised access to the unit



#### **WARNING!**

##### **Hazardous media / contamination of persons and equipment**

Possible consequence: Fatal or very serious injuries, material damage

- Ensure that the pump hoses are resistance against the media being conveyed
- Always observe the the safety data sheets for the media to be conveyed. The system operator must ensure that these safety data sheets are available and that they are kept up-to-date
- The safety data sheets for the media being conveyed are always decisive for initiating counter measures in the event of leakage to the media being conveyed
- Observe the general restrictions in relation to viscosity limits, chemical resistance and density
- Always switch the pump off before exchanging the pump hose

**WARNING!****Correct and proper use**

Possible consequence: Fatal or very serious injuries

- The unit is not intended to convey or regulate gaseous or solid media
- Do not exceed the rated pressure, speed or temperature for the pump
- The unit may only be used in accordance with the technical data and specifications provided in these operating instructions and in the operating instructions for the individual components
- The system is not designed for use in areas at risk from explosion
- Only switch the pump on if it has been properly fastened to the floor
- Only switch the pump on if the front cover has been attached.

**WARNING!****Operational lifetime of the pump hoses**

Possible consequence: Fatal or very serious injuries

The operational lifetime of the pump hoses cannot be precisely specified. For this reason, the possibility of fracture and consequential leakage of liquids must be accounted for. If the hose rupture alarm (optional) is fitted, then the pump can be stopped and / or an electrical valve can be actuated.

In addition, you must avoid particles from untight hoses being introduced into the media being conveyed. This can be achieved e.g. by means of filtration, a hose rupture alarm or other means suitable for the respective process.

**CAUTION!****CIP cleaning**

In the event of CIP cleaning, it is necessary to obtain information from the manufacturer about correct installation of the pump (a special installation is required), as well as regarding the compatibility of the cleaning agents with the pump hoses of the pump and the other hydraulic connections.

Cleaning should be undertaken at the recommended maximum temperature.

**CAUTION!****Direction of rotation / flow direction**

Possible consequence: Material damage right through to destruction of the unit

- The pump's direction of rotation in relation to the desired flow direction must be checked prior to every start.



**CAUTION!**

**Environmental influences**

Possible consequence: Material damage right through to destruction of the unit

- The device is not suitable for outdoor operation
- Take suitable measures to protect the device from environmental influences such as:
  - UV rays
  - Moisture
  - Frost, etc.

## 3 Functional description

### Brief functional description

The package contents supplied with the DULCO®flex DFBa is selectable via the identcode.

The DULCO®flex DFBa is a displacement pump. The feed chemical is conveyed by the rotor squeezing the hose in the direction of flow. No valves are needed for this. This ensures gentle handling of the metered media.

The DULCO®flex DFBa has been designed for safe and uncomplicated operation, as well as straightforward maintenance.

The DULCO®flex DFBa can be used for many different media. However, this pump type is often the optimal solution for abrasive, shear-sensitive and viscose media.

Typical areas of use include processes where only a low discharge pressure is required (max. 8 bar).

### 3.1 Construction

Main modules:

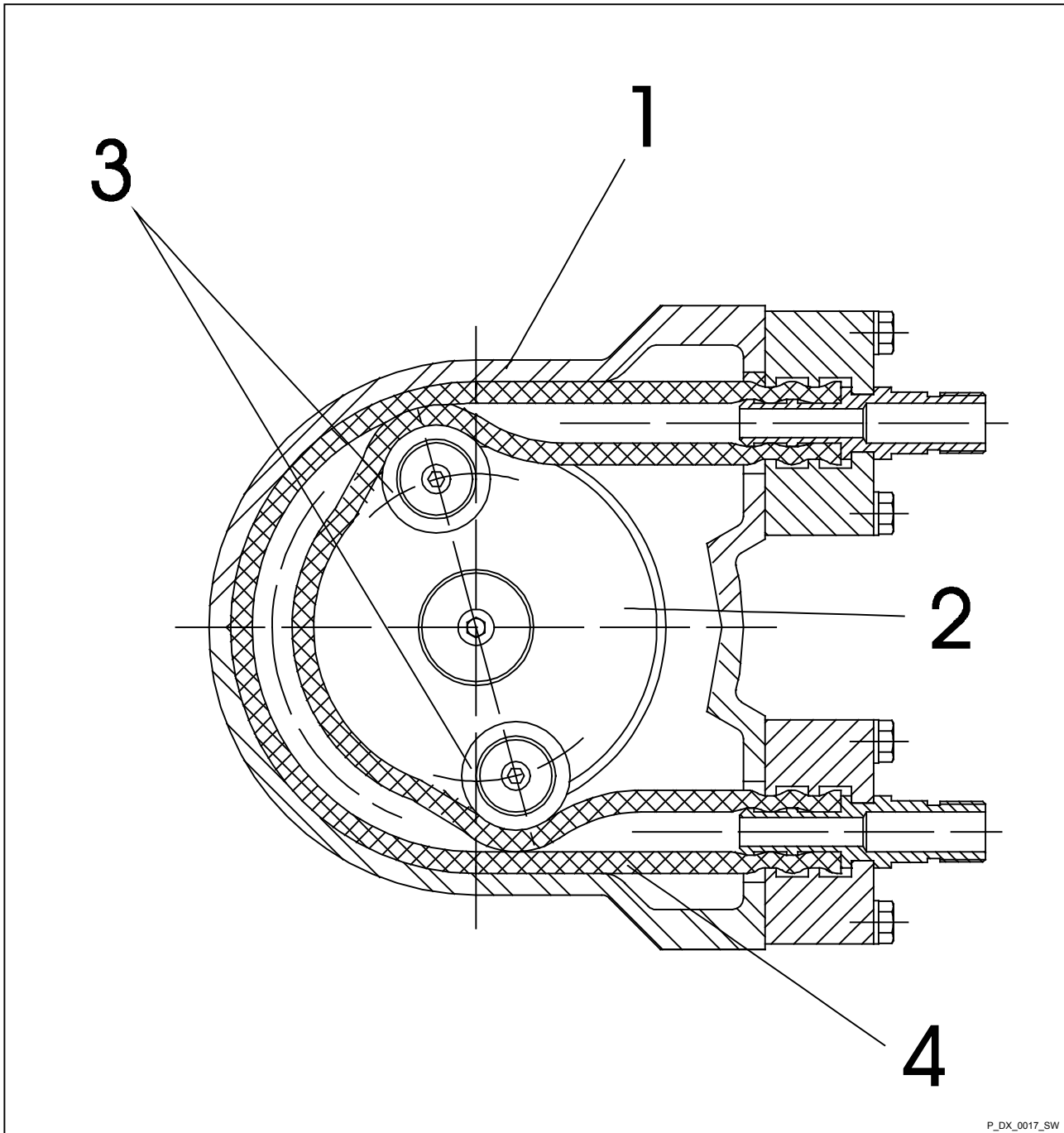
- Drive Unit
- Housing
- Base frame

The pump housing is closed off with a screwed front cover in order to avoid the risk of injury.

The motor serves to drive the rotor. Two rollers at the ends of the rotor serve to press the pump hose against the pump housing.

The rotary movement of the rotors alternately press and relax the rollers in relation to the pump hose. This serves to suck the media in and convey it into the metering line.

### 3.2 Overview of the Device



P\_DX\_0017\_SW

Fig. 1: Diagram of functional principle

- |   |         |   |         |
|---|---------|---|---------|
| 1 | Housing | 3 | Rollers |
| 2 | Rotor   | 4 | Hose    |

## 4 Transport, storage, assembly and Installation

- **User qualification, transport and storage:** instructed persons, see ↪ *Chapter 1.2 "Users' qualifications" on page 5*
- **User qualification, assembly:** trained qualified personnel, see ↪ *Chapter 1.2 "Users' qualifications" on page 5*
- **User qualification, electrical installation:** Qualified electrician, see ↪ *Chapter 1.2 "Users' qualifications" on page 5*



### WARNING!

#### Safety data sheet

Possible consequence: Fatal or very serious injuries

Always observe the corresponding data sheets for the media when carrying out any tasks which involve contact with the media that is to be conveyed.

### 4.1 Transport

#### Transport

- The pump is protected by means of cardboard packaging
- The packaging materials can be recycled
- For environmental conditions for storage and transportation see ↪ *Chapter 4.3.1 "Ambient conditions" on page 22*

### 4.2 Storage

#### Storage

- The pump hose should be removed from the housing during the duration of storage
- For storage durations longer than 60 days, the coupling surfaces (terminals, reducing adaptors, motors) are to be protected with suitable antioxidant agents
- For environmental conditions for storage and transportation see ↪ *Chapter 4.3.1 "Ambient conditions" on page 22*

### 4.3 Assembly



### CAUTION!

Possible consequence: Slight or minor injuries, material damage.

Carry out the assembly work before the electrical installation is undertaken!

Observe the permissible environmental conditions!

### 4.3.1 Ambient conditions



**NOTICE!**

**Ambient conditions**

Possible consequence: Property damage and increased wear and tear

Assembly is to be carried out in the following order. If the must has to be installed outdoors, then it is to be equipped with protection against sunlight and weather influences.

When positioning the pump, ensure that sufficient room for access is provided for all types of maintenance work.

There are limit values for temperature and pressure, depending on the type of hose selected. These limit values are described in the following section:

**Limit values for hose temperature and pressure**

Material Hose	min. temp. (°C) Feed chemical	max. temp. (°C) Feed chemical	min. temp. (°C) Environment	max. pressure (bar)
NR	-20	80	-40	8
NBR	-10	80	-40	8
EPDM	-10	80	-40	8
NR-A	-10	80	-40	8
NBR-A	-10	80	-40	8
NORPREN	-40	120	-40	2
TYGON	-10	70	-40	2

Also observe the general safety information, see ↪ *Chapter 2.1 "General safety information" on page 16*

### 4.3.2 Alignment of the suction side

The pump is to be positioned as near as possible to the liquid container, so that the suction side is kept as short and straight as possible.

The suction line must be absolutely airtight and made of a suitable material, so that it is not squeezed together under vacuum.

The diameter must correspond to the rated diameter of the pump hose. A larger diameter is recommended in the event of viscose liquids.

The pump is self-priming and does not require an admission valve. The pump is reversible and the suction connection can therefore comprise of one of two options. Normally the option is selected which is best suited to the physical conditions of the installation.

It is recommended to use a flexible transition between two fixed pipes and the hydraulic connection of the pump, in order to avoid the transmission of vibrations.

### 4.3.3 Alignment of the discharge side

The discharge line is to be kept as straight and short as possible, in order to avoid performance reduction.

The diameter must correspond to the rated diameter of the pump hose. A larger diameter is recommended in the event of viscose liquids.

It is recommended to use a flexible transition between two fixed pipes and the hydraulic connection of the pump, in order to avoid the transmission of vibrations.

### 4.3.4 Adjusting the roller pressure

The peristaltic pump is equipped with spacer plates (6), in order to adjust the precise pressure distance to the roller (9) (dependent on speed and operating pressure).

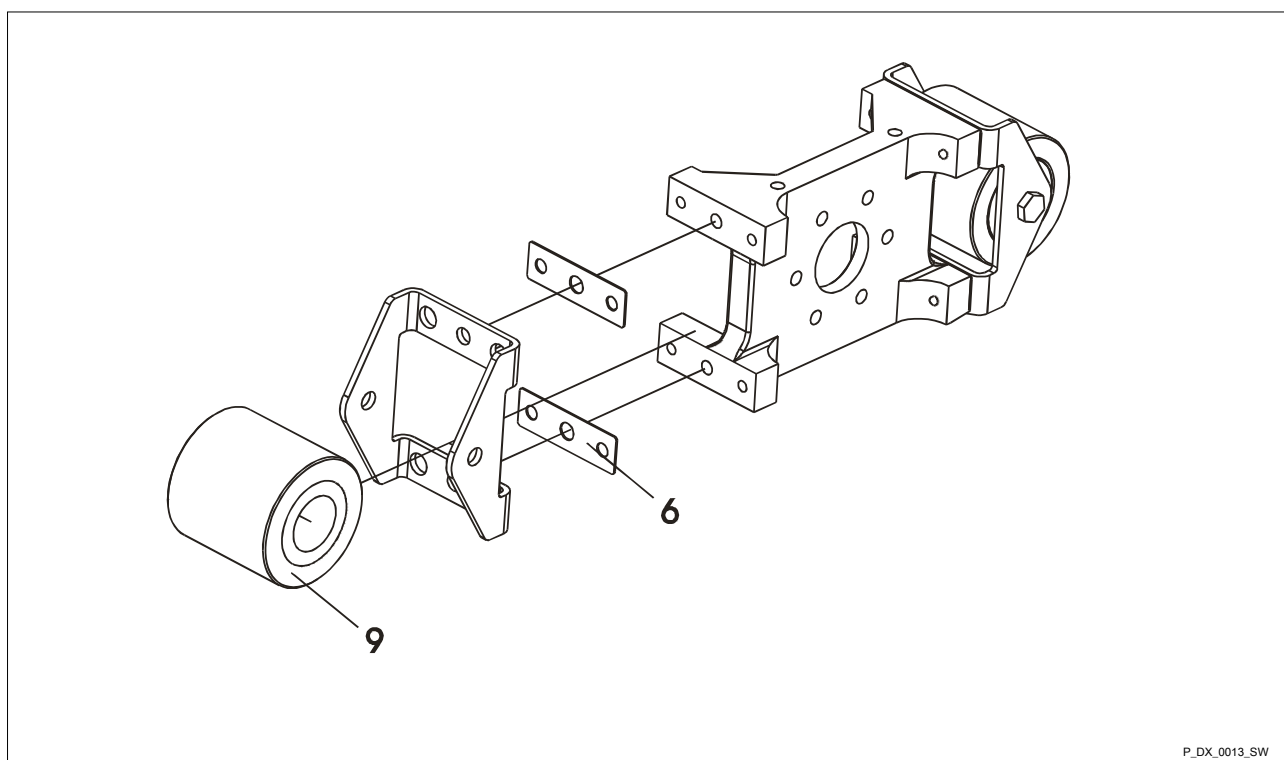


Fig. 2: Space plates / roller

- 6 Spacer plates
- 9 Roller

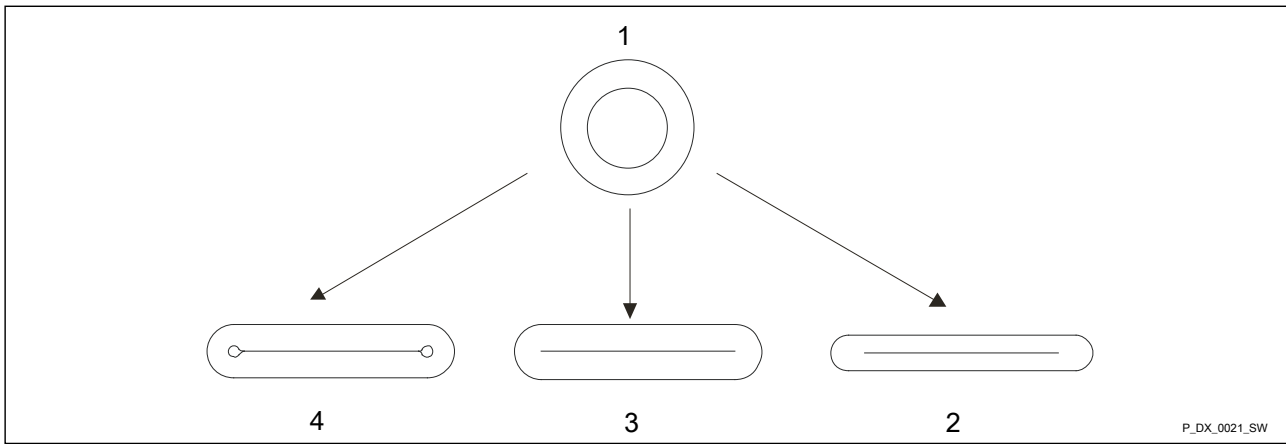


Fig. 3: Squeezing the hose

- |   |  |   |  |
|---|--|---|--|
| 1 | Hose in normal shape   | 3 | Perfect squeezing  |
| 2 | Excessive squeezing (increased wear and tear to pump and hose) | 4 | Insufficient squeezing (backflowing media in the cavity will destroy the hose within a short period of time) |

The spacer plates are fitted in the factory. You can adapt the number of spacer plates to the actual operating conditions according to the following table.

**DFBa 010 / Number of spacer plates of 0.5 mm thickness (except Norpren and TYGON):**

l/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	1	1	1	1	1
2,0	1	1	1	1	1
4,0 *	2	1	1	1	1
6,0	2	2	2		
8,0	3	2			

\* Supplied state

**DFBa 010 / Number of spacer plates of 0.5 mm thickness (Norpren and TYGON):**

l/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	5	5	5	5	5
2,0 *	5	5	5	5	5

\* Supplied state

**DFBa 013 / Number of spacer plates of 0.5 mm thickness (except Norpren and TYGON):**

l/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	1	1	1	1	1
2,0	1	1	1	1	1

\* Supplied state

1/min	0-19	20-39	40-59	60-79	80-99
bar					
4,0 *	2	1	1	1	1
6,0	2	2	2		
8,0	3	2			

\* Supplied state

DFBa 013 / Number of spacer plates of 0.5 mm thickness (Norpren and TYGON):

1/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	5	5	5	5	5
2,0*	5	5	5	5	5

\* Supplied state

DFBa 016 / Number of spacer plates of 0.5 mm thickness (except Norpren and TYGON):

1/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	1	1	1	1	1
2,0	1	1	1	1	1
4,0 *	2	1	1	1	1
6,0	2	2	2		
8,0	3	3			

\* Supplied state

DFBa 016 / Number of spacer plates of 0.5 mm thickness (Norpren and TYGON):

1/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	9	9	9	9	9
2,0 *	9	9	9	9	9

\* Supplied state

DFBa 019 / Number of spacer plates of 0.5 mm thickness (Norpren and TYGON):

1/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	5	5	5	5	5
2,0 *	5	5	5	5	5

\* Supplied state

DFBa 022 / Number of spacer plates of 0.5 mm thickness:

1/min	0-19	20-39	40-59	60-79	80-99
bar					
0,5	2	2	1	1	1
2,0	2	2	2	2	2
4,0 *	3	3	2	2	2
6,0	3	3	3		
8,0	4	3			

\* Supplied state

### 4.3.5 Performance curves



**NOTICE!**

**Maximum pressure under continuous operation**

The dotted line indicates the limit for maximum pressure under continuous operation

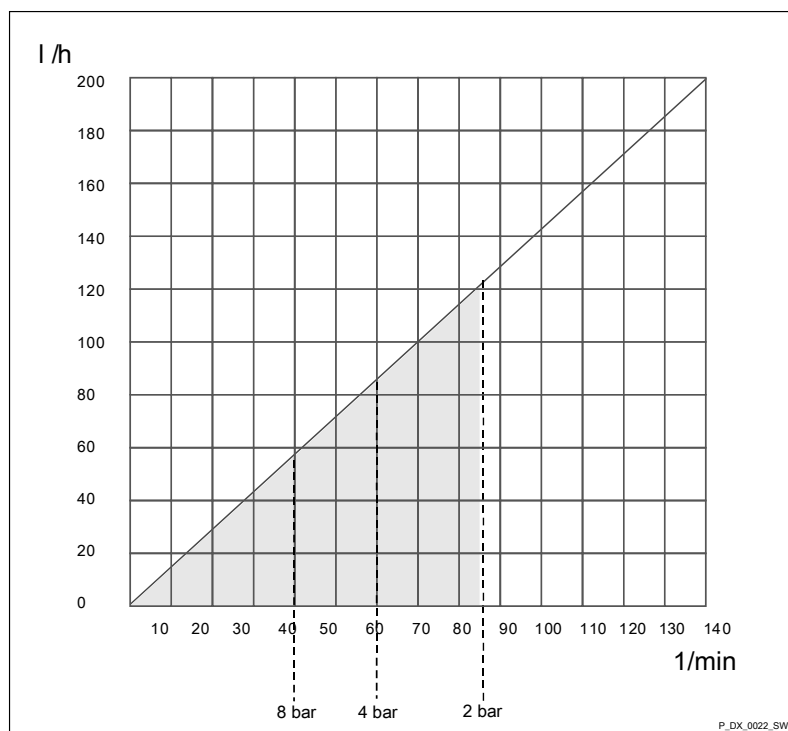


Fig. 4: DFBa 10

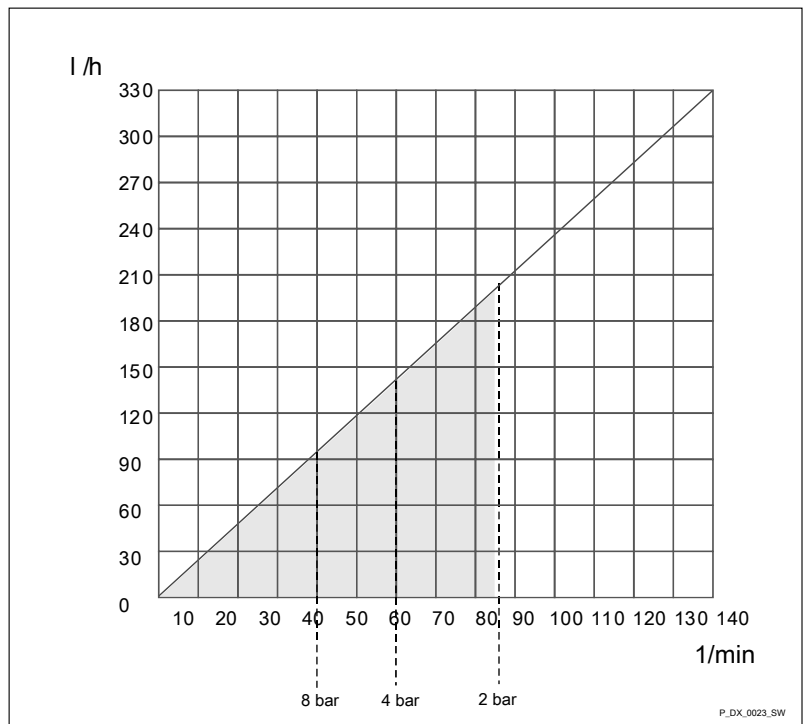


Fig. 5: DFBa 013

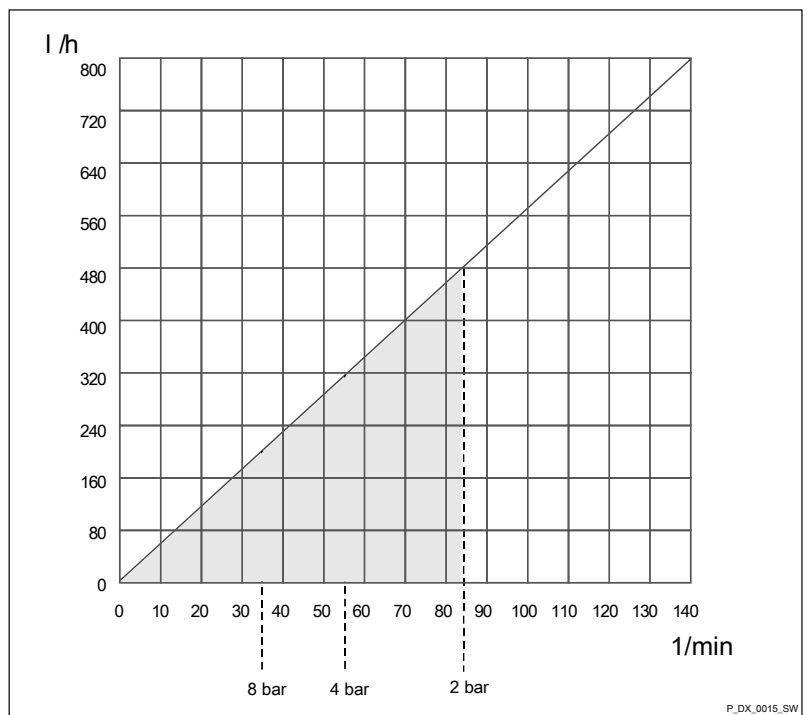


Fig. 6: DFBa 016

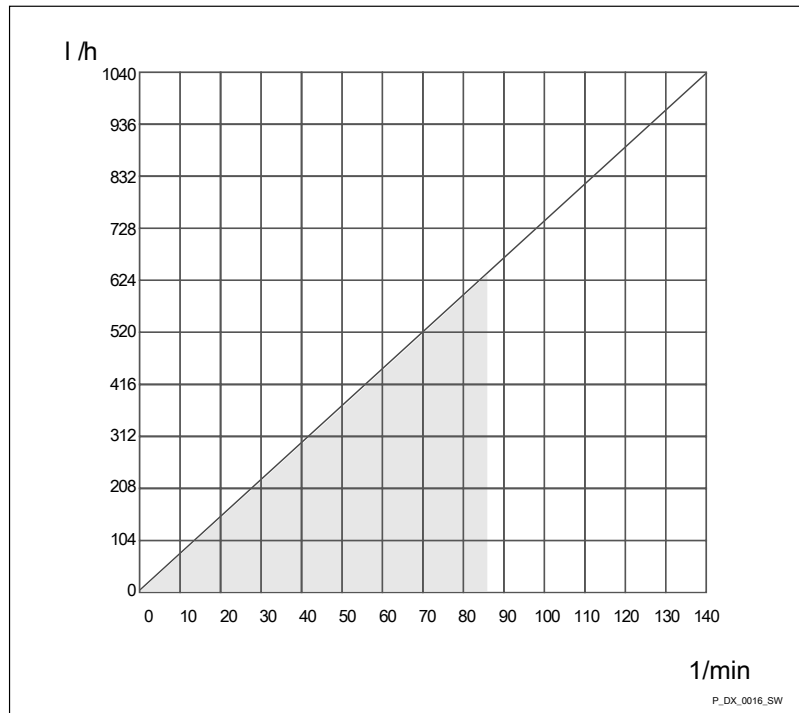


Fig. 7: DFBa 019

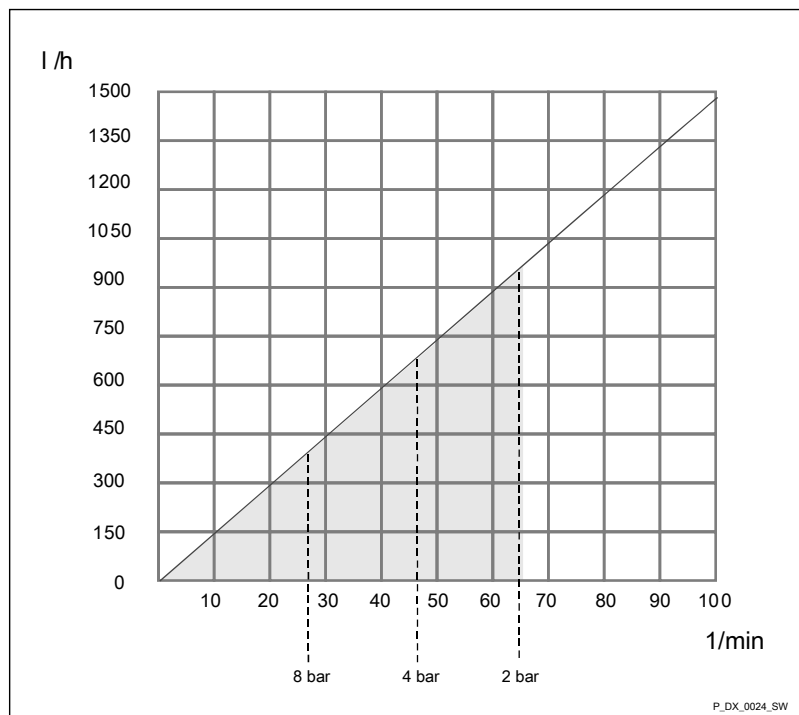


Fig. 8: DFBa 022

## 5 Commissioning

- **User qualification, commissioning:** trained user, see [Chapter 1.2 "Users' qualifications"](#) on page 5

### 5.1 Testing prior to commissioning the pump

The following tests are to be carried out:



- Ensure that the pump has not been damaged during transportation or storage. Immediately report any damage to the supplier
- Check that the mains voltage is suitable for the motor
- Ensure that the hose is suitable for the fluid to be conveyed and that it is not damaged
- Make sure that the temperature of the liquid does not exceed the recommended temperature range
- Only switch the pump on if the front cover has been properly attached
- Check that the rollers are correctly fitted and fastened
- Check that the hose and rollers are sufficiently lubricated
- Check that the thermal overload protection (not included in the delivery scope) corresponds to the value specified on the motor type plate
- Check whether the direction of rotation is correctly adjusted
- Check that the optional electrical components are connected and are working properly
- Install a manometer in the pressure line if the back-pressure value is unknown
- Check the operating instructions in order to ensure that the flow values, pressures and power consumption of the motor do not exceed the rated values
- Install a pressure relief valve in the pressure line in order to protect the pump in the event that a valve is unintentionally closed off or the line is blocked in another way.

## 6 Operating the DFBA

- **User qualification, operation:** instructed persons, see  
↳ *Chapter 1.2 "Users' qualifications" on page 5*

The peristaltic pump is to be fully integrated into the customer's designated plant and is then controlled by this plant. It is not possible to operate the pump directly.

## 7 Maintenance, repair, malfunctions, disposal and spare parts

- **User qualification, maintenance and disposal:** instructed persons, see  Chapter 1.2 "Users' qualifications" on page 5
- **User qualification, repair and malfunctions:** trained user, see  Chapter 1.2 "Users' qualifications" on page 5

### 7.1 Maintenance



#### CAUTION!

#### Disconnect the pump from the mains

Possible consequence: Personal injury









You may only carry out work on the pump after it has previously been switched off and disconnected from the mains.

#### Lubrication








- Check that the rollers and the hose are sufficiently lubricated
  - Check every 200 operating hours
- Check whether the oil level is correct for the step-down gears
  - Exchange the oil at regular intervals in accordance with the step-down gear maintenance manual.

### 7.2 Exchanging the pump hoses

#### Exchanging the pump hoses - dismantling

1.  Close off all valves, in order to prevent leakage of the feed chemical
2.  Dismantle the pump hoses from both discharge and suction sides
3.  Remove the front cover
4.  Remove a roller incl. the spacer plate (the roller that is not touching the pump hose)
5.  Turn the rotor with the help of the motor so that the remaining roller is not pressing against the pump hose
6.  Remove the pressure flange from the pump housing
7.  Remove the pump hose to be exchanged
8.  Dismantle the hydraulic connections from both pump hose ends

#### Exchanging the pump hoses - installation

1.  Clean the interior surfaces of the pump housing
2.  Lubricate the internal surfaces of the pump housing at the contact surfaces to the pump hose
3.  Check the rollers. Ensure that the roller surfaces are not damaged
4.  Attach the hydraulic connections at both hose ends with the help of the pressure flange
5.  Lay the pump hose into the pump housing
6.  Lubricate the pump hose and the rollers
7.  Fasten the pressure flange to the pump casing

8. ▶ Turn the rotor with the help of the motor so that the remaining roller presses against the pump hose
9. ▶ Re-attach the second roller with spacer plates back onto the rotor
10. ▶ Attach the front cover to the pump housing
11. ▶ Mount the pump hoses from both discharge and suction sides
12. ▶ Open all of the valves

### 7.3 Troubleshooting

Problem	Possible cause	Solution
Increased pump temperature	Pump hose has no lubricant	Lubricate pump hose
	Increased product temperature	Reduce product temperature
	Insufficient or poor suction conditions	Check suction line for blockages
	Pump speed too high	Reduce pump speed
Reduced flow or pressure	Valves on discharge and or suction side completely or partially closed	Open valves
	Pump hose insufficiently compressed	Check roller fastening
	Pump hose rupture (the product leaks out into the housing)	Exchange pump hose
	Partial blockage of the suction line	Clean pipe
	Insufficient product quantity in storage container	Fill storage container or exchange pump
	Insufficient diameter on the suction side	Increase the diameter on the suction side, as far as possible
	Suction line too long	Shorten the suction line, as far as possible
	High viscosity of medium	Reduce viscosity, as far as possible
	Air introduction in the suction connections	Check connections and accessories for air tightness
Vibrations on pumps and pipelines	The pipes are not correctly fastened	Fasten pipes correctly (e.g. wall brackets)
	Pump speed too high	Reduce pump speed
	Insufficient nominal width of the pipes	Increase nominal width
	Pump base plate loose	Fasten base plate
	Pulsation dampers insufficient or missing	Install pulsation dampers on suction and / or discharge side.
Short operational lifetime of the hoses	Chemical exposure	Check the compatibility of the hose with the liquid being conveyed, the cleaning fluid and the lubricant

Problem	Possible cause	Solution
	High pump speed	Reduce pump speed
	High conveying temperature	Reduce product temperature
	High operating pressure	Reduce operating pressure
	Pump cavitations	Check the suction conditions
Pump hose pulled into the pump housing	High inlet pressure (> 3 bar)	Reduce inlet pressure
	Pump hose filled with deposits	Clean or replace the pump hose
	Holder (pressure flange) insufficiently tightened	Re-tighten holder (pressure flange)
The pump does not start up	Insufficient motor performance	Check motor and replace if necessary
	Insufficient output from frequency converter	The frequency converter must match the motor
		Check voltage. Start occurs at minimum 10 Hz
Blockage in the pump	Check if the suction or discharge side is blocked. Rectify blockage	

## 7.4 Disposal of Used Parts



### **WARNING!**

#### **Danger due to feed chemicals**

Possible consequence: Fatal or serious injuries

In the event that damage to the pump hose causes the pump to be contaminated with feed chemicals, then it is to be decontaminated with suitable agents (refer to the feed chemical safety data sheets).



### **NOTICE!**

**If no Declaration of Decontamination is affixed to the delivery, acceptance of the devices will be refused.**

(also available as download from: [www.prominent.com](http://www.prominent.com))

A signed "Declaration of Decontamination" is required by law and in order to protect our staff, before your order can be processed.

Please ensure that this is attached to the outside of the package. Otherwise we are unable to accept your delivery.



### **NOTICE!**

#### **Regulations governing disposal of used parts**

- Note the current national regulations and legal standards which apply in your country

The pump hose is to be removed and disposed of on-site before sending the pump to ProMinent Dosiertechnik GmbH, Heidelberg / Germany.

ProMinent Dosiertechnik, Heidelberg/Germany is prepared to take back clean used parts.

## 7.5 Spare parts

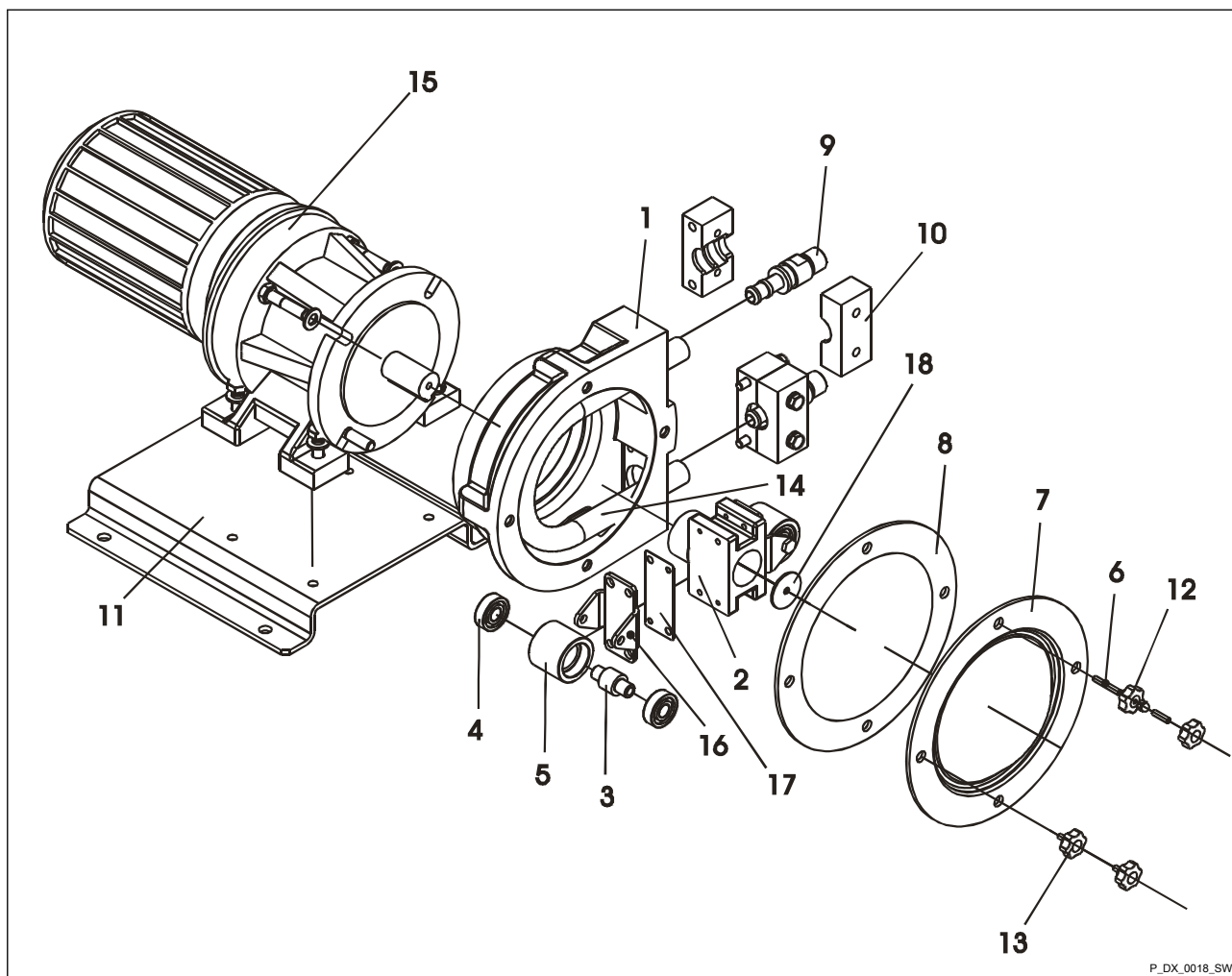


Fig. 9: Spare parts exploded view DFBA 010/013

DFBA 010				
refer to Fig. 9				
Pos.	Description	Quantity	Reference	Part number
1	Pump housing	1	102.02.01	
2	Rotor (2 rollers)	1	102.02.03	
3	Rotor shaft	2	102.01.04	
4	Roller ball bearings	4	102.01.02	
5	Roller $\varnothing 35$	2	102.01.09	
6	Long bolts	1	102.00.07	
	Short bolts	3	102.00.14	
7	Front cover	1	102.00.08	
8	Seal front cover	1	102.00.05	
9	Connection VA-BSP	2	102.00.10	
	Connection PP-BSP	2	102.00.15	
	Connection PVDF-BSP	2	102.00.16	
	Connection VA-NPT	2	102.00.17	

**DFBa 010**

refer to Fig. 9

Pos.	Description	Quantity	Reference	Part number
	Connection PP-NPT	2	102.00.18	
	Connection PVDF-NPT	2	102.00.19	
	Connection DIN	2	102.00.20	
	Connection SMS	2	102.00.21	
	Connection TRI-CLAMP	2	102.00.22	
10	Pressure flange, standard	2	102.00.11	
	Pressure flange, thermoplastic hose	2	102.00.23	
11	Base plate	1	102.00.12	
	Base plate, stainless steel	1	102.00.24	
12	Nut	1	102.00.25	
13	Box nut	3	102.00.26	
14	Pump hose NR	1		1037150
	Pump hose NBR	1		1037151
	Pump hose EPDM	1		1037152
	Pump hose NR-A	1		1037153
	Pump hose NBR-A	1		1037154
	Pump hose NORPRENE	1		1037155
	Pump hose HYPAGLON	1		1037156
15	Drive	1		
16	Roller holder	2	102.01.06	
17	Spacer plate		102.01.07	
18	Rotor washer	1	102.01.10	

**DFBa 013**

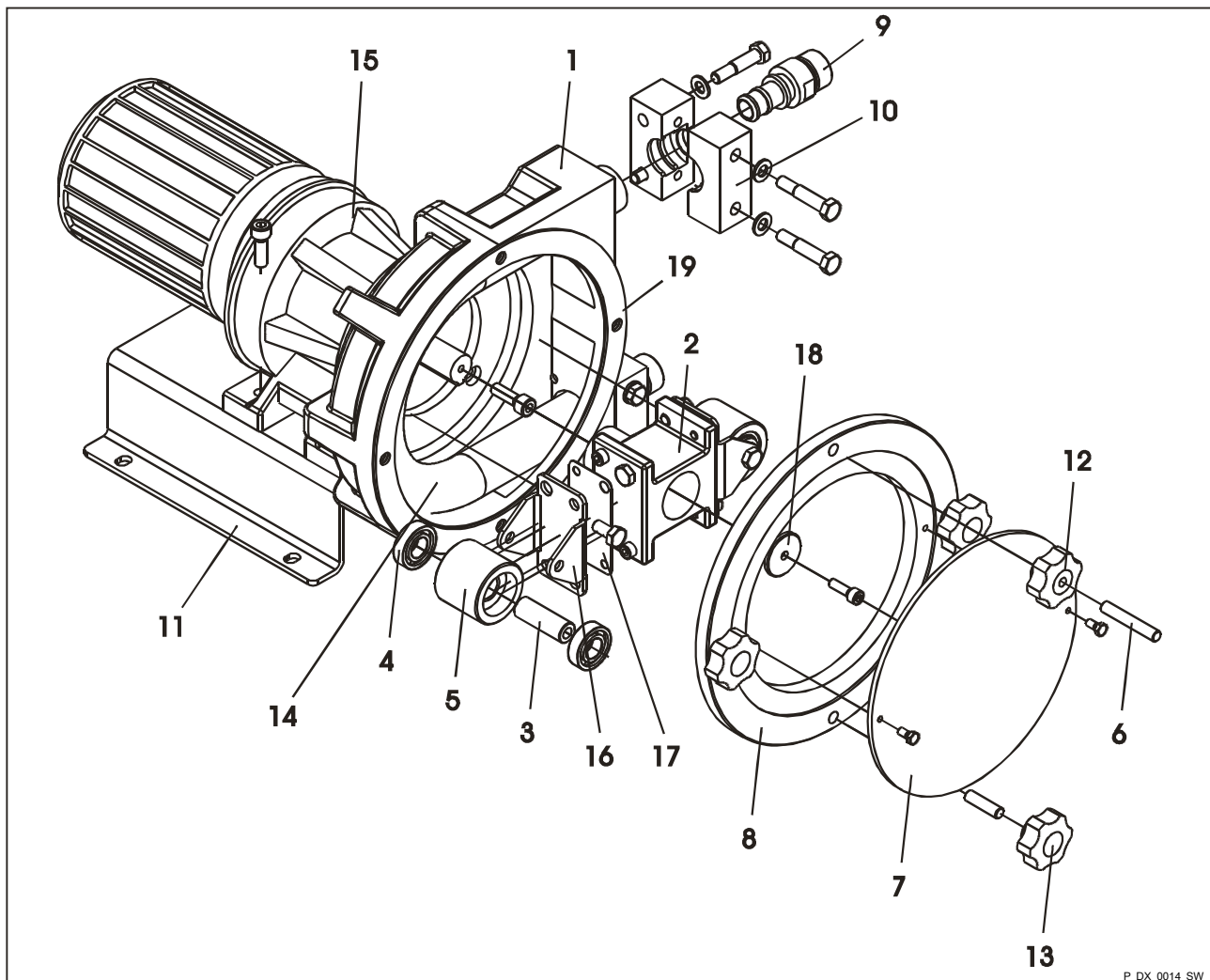
refer to Fig. 9

Pos.	Description	Quantity	Reference	Part number
1	Pump housing	1	102.01.01	
2	Rotor (2 rollers)	1	102.01.03	
3	Rotor shaft	2	102.01.04	
4	Roller ball bearings	4	102.01.02	
5	Roller ø35	2	102.01.09	
6	Long bolts	1	102.00.07	
	Short bolts	3	102.00.14	
7	Front cover	1	102.01.08	
8	Seal front cover	1	102.01.05	

## DFBa 013

refer to Fig. 9

Pos.	Description	Quantity	Reference	Part number
9	Connection VA-BSP	2	103.00.10	
	Connection PP-BSP	2	103.00.15	
	Connection PVDF-BSP	2	103.00.16	
	Connection VA-NPT	2	103.00.17	
	Connection PP-NPT	2	103.00.18	
	Connection PVDF-NPT	2	103.00.19	
	Connection DIN	2	103.00.20	
	Connection SMS	2	103.00.21	
	Connection TRI-CLAMP 3/4"	2	103.00.22	
10	Pressure flange, standard	2	103.00.11	
	Pressure flange, thermoplastic hose	2	102.00.11	
11	Base plate	1	102.00.12	
	Base plate, stainless steel	1	102.00.24	
12	Nut	1	102.00.25	
13	Box nut	3	102.00.26	
14	Pump hose NR	1		1037157
	Pump hose NBR	1		1037158
	Pump hose EPDM	1		1037159
	Pump hose NR-A	1		1037160
	Pump hose NBR-A	1		1037161
	Pump hose NORPRENE	1		1037162
	Pump hose HYPALON	1		1037163
15	Drive	1		
16	Roller holder	2	102.01.06	
17	Spacer plate		102.01.07	
18	Rotor washer	1	102.01.10	



P. DX. 0014. SW

Fig. 10: Spare parts exploded view DFbA 016/019

**DFbA 16**

refer to Fig. 10

Pos.	Description	Quantity	Reference	Part number
1	Pump housing	1	101.02.01	
2	Rotor	1	101.02.03	
3	Rotor shaft	2	101.01.04	
4	Roller ball bearings	4	101.01.36	
5	Roller ø45	2	105.01.07	
6	Long bolts	1	102.00.07	
	Short bolts	3	102.00.14	
7	Front cover	1	101.00.12	
8	Seal front cover	1	101.00.11	
9	Connection VA-BSP	2	101.00.13	
	Connection PP-BSP	2	101.00.14	
	Connection PVDF-BSP	2	101.00.15	

**DFBa 16**

refer to Fig. 10

Pos.	Description	Quantity	Reference	Part number
	Connection VA-NPT	2	101.00.16	
	Connection PP-NPT	2	101.00.17	
	Connection PVDF-NPT	2	101.00.18	
	Connection DIN	2	101.00.19	
	Connection SMS	2	101.00.20	
	Connection TRI-CLAMP	2	101.00.21	
10	Pressure flange, standard	2	101.00.22	
	Pressure flange, thermoplastic hose	2	101.00.23	
11	Base plate	1	101.00.24	
	Base plate, stainless steel	1	101.00.25	
12	Nut	1	102.00.25	
13	Box nut	3	102.00.26	
14	Pump hose NR	1		1037164
	Pump hose NBR	1		1037165
	Pump hose EPDM	1		1037166
	Pump hose NR-A	1		1037167
	Pump hose NBR-A	1		1037168
	Pump hose NORPREN	1		1037169
	Pump hose TYGON	1		1037170
	Pump hose HYPAGLON	1		1037171
15	Drive	1		
16	Roller holder	2	101.02.34	
17	Spacer plate		101.02.35	
18	Rotor washer	1	101.02.13	
19	Cover seal	1	101.02.40	

**DFBa 019**

refer to Fig. 10

Pos.	Description	Quantity	Reference	Part number
1	Pump housing	1	101.02.01	
2	Rotor	1	101.02.03	
3	Rotor shaft	2	101.01.04	
4	Roller ball bearings	4	101.01.36	
5	Roller D45	2	105.01.07	
6	Long bolts	1	102.00.07	

DFBa 019

refer to Fig. 10

Pos.	Description	Quantity	Reference	Part number
	Short bolts	3	102.00.14	
7	Front cover	1	101.00.12	
8	Seal front cover	1	101.00.11	
9	Connection VA-BSP	2	105.00.13	
	Connection PP-BSP	2	105.00.14	
	Connection PVDF-BSP	2	105.00.15	
	Connection VA-NPT	2	105.00.16	
	Connection PP-NPT	2	105.00.17	
	Connection PVDF-NPT	2	105.00.18	
	Connection DIN	2	105.00.19	
	Connection SMS	2	105.00.20	
	Connection TRI-CLAMP	2	105.00.21	
10	Pressure flange, standard	2	101.00.22	
11	Base plate	1	101.00.24	
	Base plate, stainless steel	1	101.00.25	
12	Nut	1	102.00.25	
13	Box nut	3	102.00.26	
14	Pump hose TYGON	1		1037172
	Pump hose NORPREN	1		1037173
15	Drive	1		
16	Roller holder	2	101.02.34	
17	Spacer plate		101.02.35	
18	Rotor washer	1	101.02.13	
19	Cover seal	1	101.02.40	

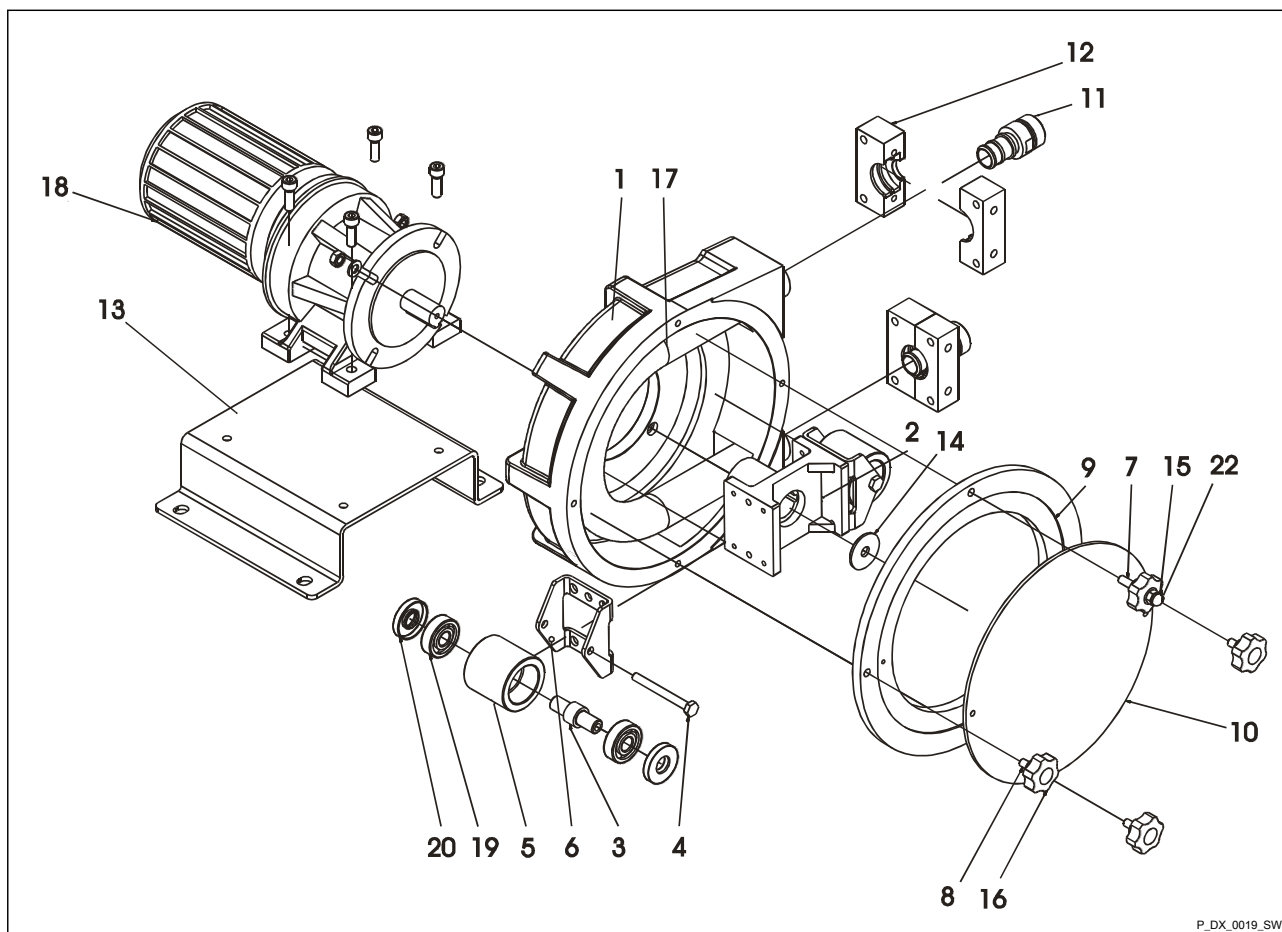


Fig. 11: Spare parts exploded view DFBA 22

**DFBA 022**

refer to Fig. 11

Pos.	Description	Quantity	Reference	Part number
1	Pump housing	1	113.00.01	
2	Rotor	1	113.00.02	
3	Rotor shaft	2	113.00.03	
4	Screw rotor shaft	2	113.00.04	
5	Roller standard	2	113.00.05	
	Roller for thermoplastic hose	2	113.00.06	
6	Take-up roller	2	113.00.07	
7	Long bolts	1	102.00.07	
8	Short bolts	3	102.00.14	
9	Seal front cover	1	113.00.08	
10	Front cover	1	113.00.09	
11	Connection VA-BSP	2	113.00.10	
	Connection PP-BSP	2	113.00.11	
	Connection PVDF-BSP	2	113.00.12	

**DFBa 022**

refer to Fig. 11

Pos.	Description	Quantity	Reference	Part number
	Connection VA-NPT	2	113.00.13	
	Connection PP-NPT	2	113.00.14	
	Connection PVDF-NPT	2	113.00.15	
	Connection DIN	2	113.00.16	
	Connection SMS	2	113.00.17	
	Connection TRI-CLAMP	2	113.00.18	
12	Pressure flange, standard	2	113.00.19	
	Pressure flange, thermoplastic hose	2	113.00.20	
13	Base plate	1	113.00.21	
	Base plate, stainless steel	1	113.00.22	
14	Rotor washer	1	113.00.23	
15	Nut	1	102.00.25	
16	Box nut	3	102.00.26	
17	Pump hose NR	1		1037175
	Pump hose NBR	1		1037176
	Pump hose EPDM	1		1037178
	Pump hose NR-A	1		1037179
	Pump hose NBR-A	1		1037180
	Pump hose NORPREN	1		1037181
	Pump hose HYPALON	1		1037182
18	Drive	1		
19	Roller bearing	4	113.00.31	
20	Seal roller bearing	4	113.00.32	

**Lubricant**

Pos.	Description	Quantity	Reference	Part number
1	0.5 kg silicone grease for DULCO®flex DFBa	1		1037255
2	1.0 kg silicone grease for DULCO®flex DFBa	1		1037256

## 8 Technical data DFBa

Type DFBa	Feed rate in l/U	P max. in bar	Flow rate at max. pressure in l/h	Rollers/shoes	Hose interior ø in mm	Solids max. ø in mm	Weight without drive in kg	Connector DN
010	0,024	8	56	Rollers	10	2,5	6	3/8"
013	0,039	8	92	Rollers	13	3,3	6	3/8"
016	0,092	8	200	Rollers	16	4,0	13	3/4"
019	0,12	2	600	Rollers	19	4,8	13	1"
022	0,24	8	375	Rollers	22	5,5	22	1"

### 8.1 Dimensions DFBa 010 / 013

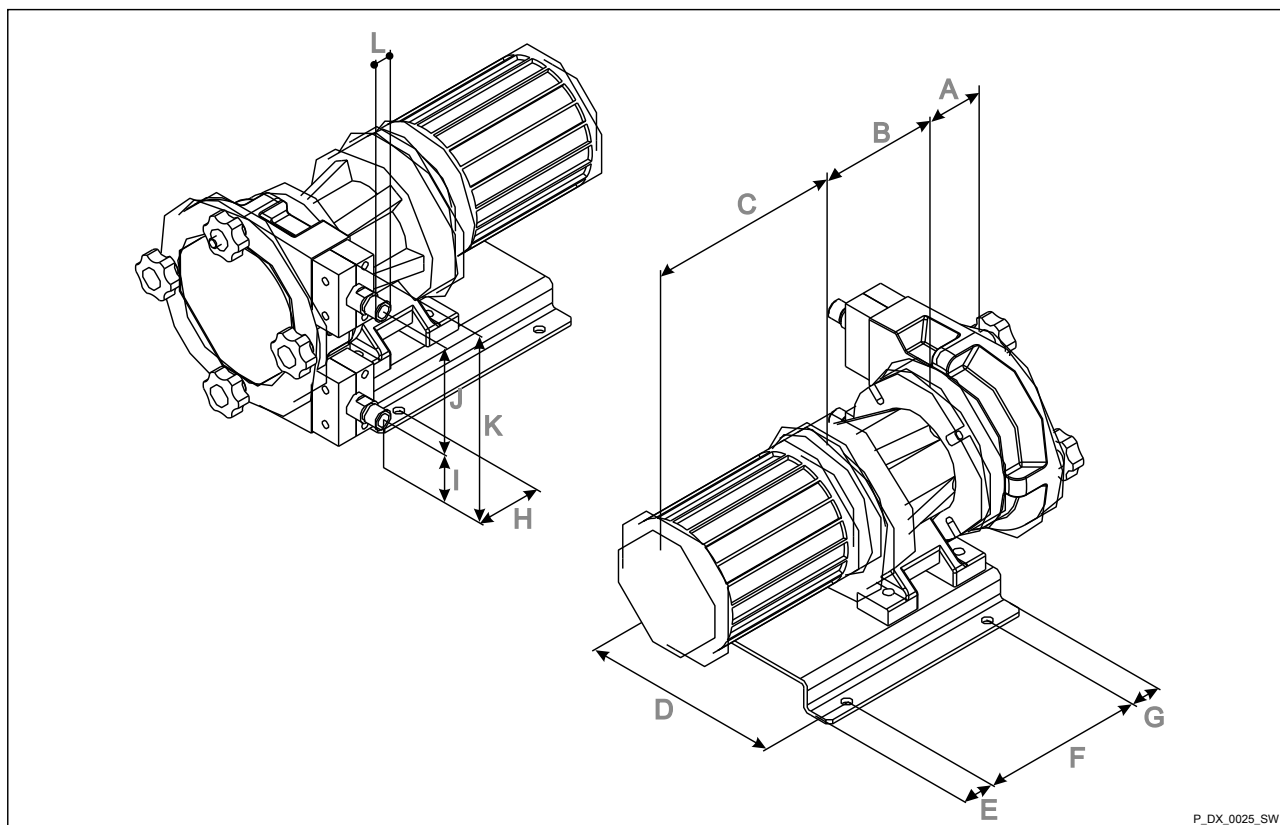
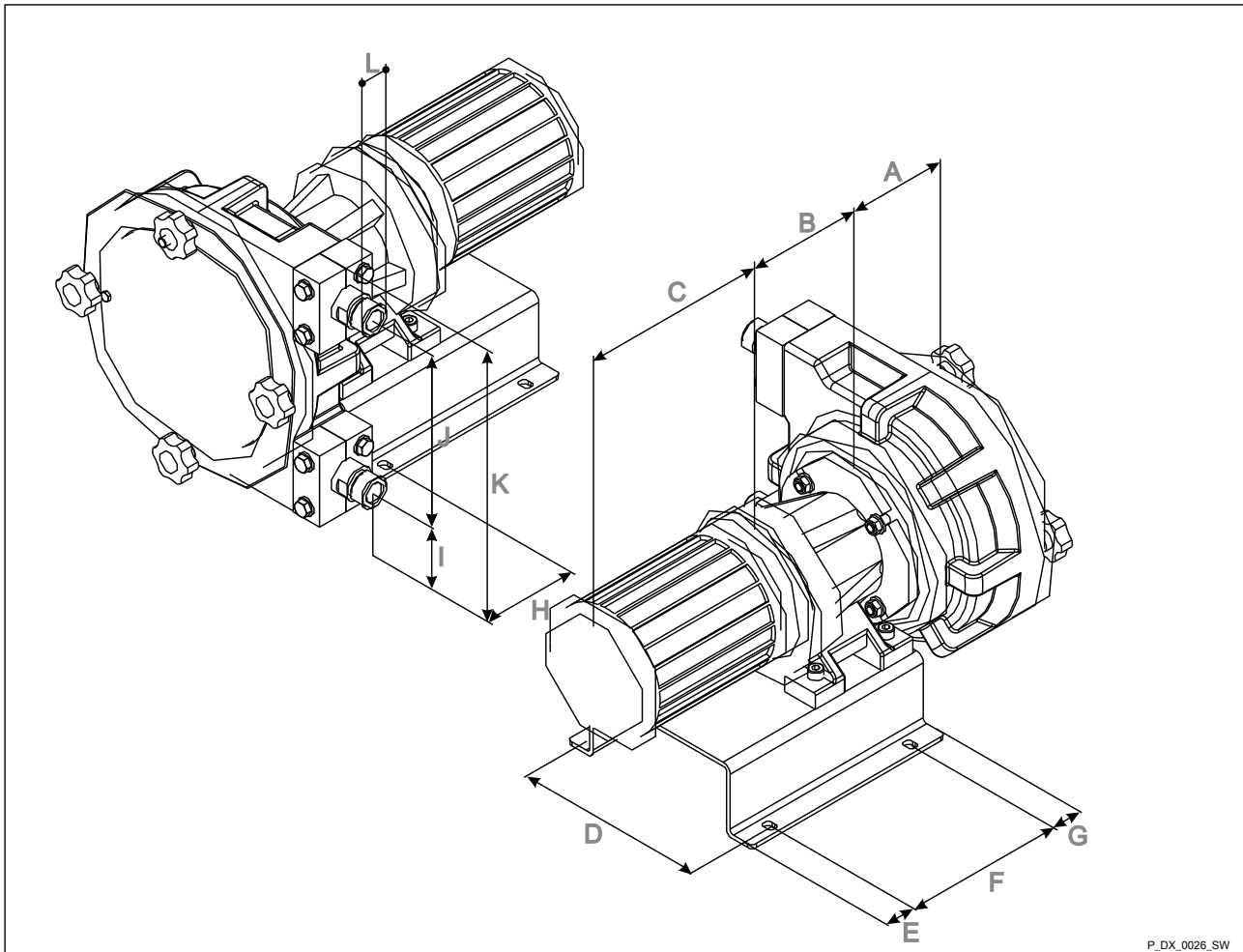


Fig. 12: Dimensions DFBa 010 / 013

A 70 mm  
 B \*  
 C \*  
 D 190 mm  
 E 30 mm  
 F 160 mm  
 G 30 mm

H 61 mm  
 I 60 mm  
 J 115 mm  
 K 210 mm  
 L 3/8" BSP  
 \* Dependent on selected drive

## 8.2 Dimensions DFBa 016 / 019



P\_DX\_0026\_SW

Fig. 13: Dimensions DFBa 016 / 019

A	119 mm	H	75 mm
B	*	I	60 mm
C	*	J	170 mm
D	190 mm	K	265 mm
E	30 mm	L	3/4" BSP
F	160 mm	*	Dependent on selected drive
G	30 mm		

### 8.3 Dimensions DFBa 022

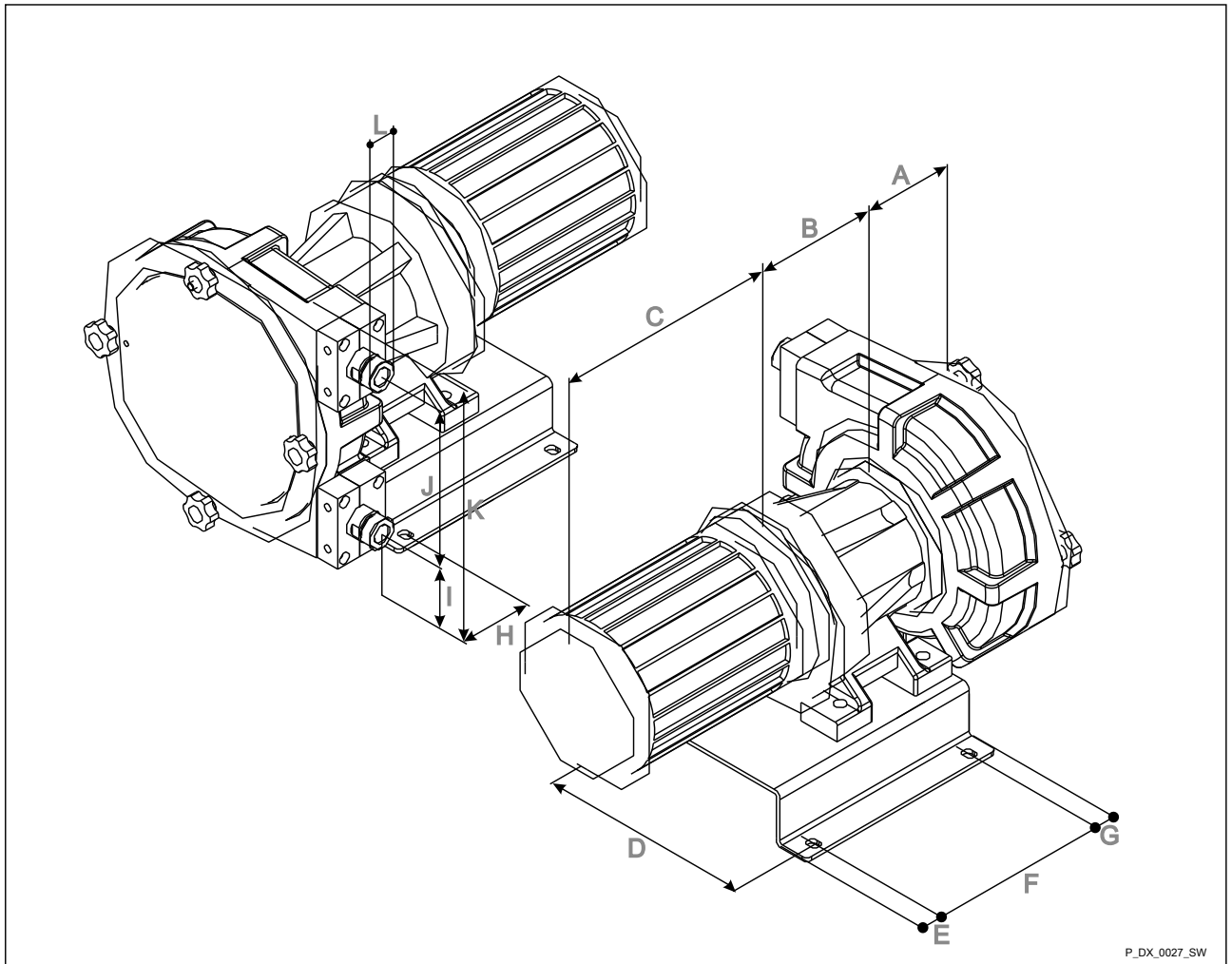


Fig. 14: Dimensions DFBa 022

A	110 mm	H	95 mm
B	*	I	85 mm
C	*	J	210 mm
D	245 mm	K	355 mm
E	25 mm	L	1" BSP
F	175 mm	*	Dependent on selected drive
G	25 mm		

## 9 DFBa technical appendices

### 9.1 Declaration of Conformity


<b>- Original - EC Declaration of Conformity</b>	
We hereby declare,	<b>ProMinent Dosiertechnik GmbH Im Schuhmachergewann 5 - 11 DE - 69123 Heidelberg</b>
that the following designated product complies with the pertinent fundamental safety and health requirements of the EC Directive in terms of its design and construction and in terms of the version marketed by us. This declaration loses its validity in the event of a modification to the product not agreed with us.	
Description of the product:	<b><i>Peristaltic pump DULCOflex</i></b>
Product type:	<b><i>DFAa..., DFBa..., DFCa..., DFDa...</i></b>
Serial no.:	<b><i>refer to nameplate on the device</i></b>
Pertinent EC Directives:	<b><i>EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC) The protection targets laid out in the low-voltage regulations 2006/95/EG have, as shown in appendix I, Nr. 1.5.1 of the machine regulations 2006/42/EG been adhered to</i></b>
Applied harmonised standards in particular:	<b><i>EN ISO 12100-1, EN ISO 12100-2, EN 809, EN 60204-1, EN 60034-1, EN 60034-5, EN 60034-7, EN 61000-6-1, EN 61000-6-2</i></b>
Technical manuals were prepared by authorized documentation personnel:	<b><i>Norbert Berger Im Schuhmachergewann 5-11 DE-69123 Heidelberg</i></b>
Date / Manufacturer - Signature :	 _____
Details of the signatory:	<b><i>Joachim Schall, Head of Research and Development</i></b>

Fig. 15: EC Declaration of Conformity

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