GEA Farm Technologies

RPS 400 - 2800

Vacuum pumps / Pump sets / Machine sets

Instruction Manual / Installation Instructions / Parts List
(Translation of the original operating instructions)

7045-9001-025
11-2010

GEA Farm Technologies - The right choice.

Contents

1 Preface

1.1 Information on the instructions

The manufacturer reserves the right to make changes due to technical developments in the data and images given in this manual.

Reproductions, translations and copies of any kind, even of extracts, require written authorization from the manufacturer.

These instructions are supplied with the product.

- They should be kept close at hand and remain with the equipment even if the equipment is sold.
- This manual is not subject to an amendment service. The most recent version at any time can be obtained through the technical dealer or directly from the manufacturer.
- They are designed modular and are only in relation to the mentioned product.
  For details of the components which are relevant to the product, please refer to the appropriate manuals.
  This applies especially for safety information!

Pictograms used


This pictogram indicates information that will help towards a better understanding of the working processes.


This pictogram indicates a special tool required for installation.

A correction bar in the margin indicates changes to the previous edition.


This pictogram refers to another document or chapter.

If a manual number is given, the middle 4 figures indicate the language, as follows:

	Language		**Language**		**Language**
-9000-	German	-9013-	Dutch	-9032-	Serbian
-9001-	English (Great Britain)	-9015-	English (America)	-9034-	Slovakian
-9002-	French (France)	-9016-	Polish	-9036-	Lithuanian
-9003-	Italian	-9021-	Danish	-9038-	Portuguese (Brazil)
-9004-	Romanian	-9022-	Hungarian	-9039-	French (Canada)
-9005-	Spanish	-9023-	Czech	-9040-	Latvian
-9007-	Swedish	-9024-	Finnish	-9041-	Estonian
-9008-	Norwegian	-9025-	Croatian	-9043-	Spanish (North America)
-9009-	Russian	-9027-	Bulgarian		
-9010-	Greek	-9029-	Slovene		
Possibly not all above-mentioned languages are available.					

Scope of the operating instructions

RPS series pumps cover the range from 400 l/min bis 2800 l/min.

The basic hierarchy of assembly stages in the RPS range is as follows:

Vacuum pump compl.	=	Basic type or replacement pump
⇓		
Pump set, complete	=	including lubrication, exhaust system, base plate without and without motor
⇓		
Machine set, complete	=	including vacuum tank and regulating valve

There are four types available. These operating instructions apply to the following pumps/components in the RPS range.

Type	Assembly stage	Order number
RPS 400	Vacuum pump	7047-1350-___
RPS 800 -1200		7049-1350-___
RPS 1500 - 2100		7043-1350-___
RPS 2800		7050-1350-___
RPS 400	Pump set, complete	7047-1150-___
RPS 800		7048-1150-___
RPS 1200		7049-1150-___
RPS 1500		7043-1150-___
RPS 2100		7043-1150-___
RPS 2800		7050-1150-___
RPS 400	Machine set, complete	7047-1100-___
RPS 800		7048-1100-___
RPS 1200		7049-1100-___
RPS 1500		7043-1100-___
RPS 2100		7043-1100-___
RPS 2800		7050-1100-___

1.2 Manufacturer's address

GEA Farm Technologies GmbH
Siemensstraße 25-27
D-59199 Bönen

☎ +49 (0) 2383 / 93-70
🖷 +49 (0) 2383 / 93-80
✉ contact@gea-farmtechnologies.com
@ www.gea-farmtechnologies.com

1.3 Customer service

Authorised Technical Dealer

If necessary, please contact your nearest authorised technical dealer.

There is a comprehensive dealer Internet search function on our website at the following address:

- www.gea-farmtechnologies.com

European Contact Information:

GEA Farm Technologies GmbH
Siemensstraße 25-27
D-59199 Bönen

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1.4 Declaration of conformity

Declaration of conformity in accordance with the machinery directive:
2006/42/EC- Annex:II A

Manufacturer:	**GEA Farm Technologies GmbH** **Siemensstraße 25-27** **D-59199 Bönen**
Product category:	**Vacuum pump set**
Name / Model:	**RPS 400 / 800 / 1200 / 1500 / 2100 / 2800**

The named product is in conformity with the requirements of the following European directives:

2006/42/EC	Machinery Directive
2004/108/EC	Electromagnetic compatibility directive

Conformity with the requirements of these directives is testified by complete adherence to the following standards:

- Harmonized European standards

EN 953 (2009-07)	Safety of machinery Separating safety devices
EN 1037 (2008-11)	Safety of machinery Avoidance of unexpected start-up
EN ISO 2151 (2009-01)	Acoustics Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN 12100-1 (2009-10)	Machine safety, basic terms, general design guidelines. Part 1: Basic terminology, methods
EN 12100-2 (2009-10)	Machine safety, basic terms, general design guidelines. Part 2: Technical guidelines and specifications
EN ISO 13732-1 (2008-12)	Ergonomics of the thermal environment - Methods for the assessment of human reaction on contact with surfaces - Part 1: Hot surfaces
EN ISO 13857 (2008-06)	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
EN ISO 14121-1 (2007-12)	Safety of machinery - Risk assessment - Part 1: Principles
EN 60204-1 (2007-06)	Electrical equipment of machines
EN 61310-1 (2008-09)	Safety of machinery Requirements for visual, acoustic and tactile signals

Person responsible for compiling the relevant technical documents:

Josef Schröer
GEA Farm Technologies GmbH
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☏ +49 (0) 2383 / 93-70

Bönen, 03.02.2010

Reinhard Frenser
(Head of Research and Development)

The undersigned is acting by virtue of power of attorney from the management of:
GEA Farm Technologies GmbH, Siemensstraße 25-27, D-59199 Bönen

This declaration certifies compliance with the guidelines indicated, but does not establish any guarantee in the sense of paragraphs 443, 444 BGB.
This declaration of conformity becomes invalid if design changes are made which affect the technical data given in the instructions and the correct use of the product, thereby significantly altering the machine!

2 Safety

2.1 Owner's obligation of care

The product has been designed and constructed while taking account of a potential risk analysis and after careful selection of the harmonized standards and other technical specifications to be complied with. It therefore guarantees a maximum level of safety.

This safety can only be achieved in practice on the farm however when all of the necessary measures have been taken. It is part of the owner's obligation of care to plan these measures and check that they are carried out.

In particular, the owner must ensure that

- Everyone who works with or performs activities in connection with the product carefully reads the instructions (especially the safety instructions and warnings) and signs to confirm that they have understood them and will act in accordance with them!
- A full set of legible instructions is always kept by the product.
- Anyone who has to carry out work on the product can look at the instructions at any time.
- The legal requirements are observed.
- The product
  - Is only used for its intended purpose.
  - should only be operated when in perfect working order and particularly the safety equipment should be checked regularly to ensure it is working.
- Safety signs, plates and decals, which are attached to the product, must be replaced immediately if they become illegible or lost.
- All safety or warning instructions applied are not removed and remain legible.

2.2 Explanation of the safety symbols used

Safety symbols draw attention to the importance of the adjacent text.

The design of the warnings is based on ISO 3864-2 and ANSI535.6.

Safety symbols and signaling word

WARNING!
The indication ”Warning” signals danger to life or health of personnel. Death or serious injury may result if the danger is not avoided.

Attention!
The indication ”Attention” signals important information on risks for the product or the environment.

2.3 Basic safety instructions

Note!
There are warnings about specific residual dangers in the corresponding chapters.

- There are risks involved in the operation and maintenance of equipment for dairy farms. For your own safety, read and follow the operating manual carefully (especially the section entitled ”Safety information”)!
- The chapter on ”Technical data” gives the permissible working conditions (pressure ranges, temperature ranges, airflow quantities etc.) and these must be observed!
- Do not open or dismantle devices (risk of injury)!
- Do not remove any protective devices (risk of injury)!
- Observe measures on protection against noise!
- Always keep the control cabinet, all electricity supply units, and electrical control units closed. Access is only permitted to authorized personnel with a key or special tool.
- Protect live and high-voltage components against moisture. Under no circumstances may water jets or high-pressure cleaners be directed at these!

Burn hazard

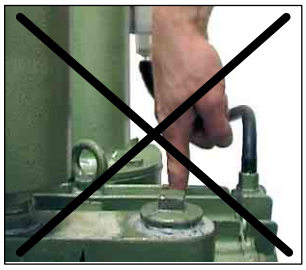
Burn hazard on the pump housing

High temperatures occur inside the pumps because of the compression process and the friction of the pump vane or bearing.

These are carried off to the ambient air through the external surfaces of the pump housing.

The surfaces of the pump housing may therefore reach temperatures up to 100 °C during operation.

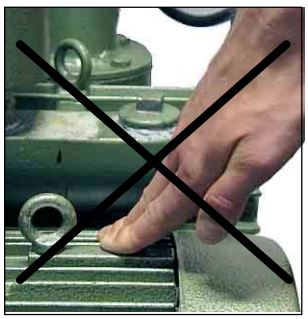
Attention!
Warning, hot surfaces!
Touching the surfaces of the pump housing even briefly may cause burns to the skin. It is therefore only safe to touch the unit after it has been switched off and has undergone a cooling phase of approx. 1 1/2 hours.



Burn hazard on the drive unit

A burn hazard should always be assumed during operation in the case of pump units which are supplied from the factory together with a drive.

Attention!
Warning, hot surfaces!
It is only safe to touch the surfaces of the drive unit / electric motorist after they have been switched off and have undergone a cooling phase of approx. 1 1/2 hours.



Burn hazard on the air intake, exhaust components

A burn hazard should always be assumed during operation in the case of pump units which are supplied from the factory together with intakes or silencers and/or oil traps.

Attention!
Warning, hot surfaces!
It is only safe to touch the surfaces of the intake or silencer and/or oil trap after it has been switched off and has undergone a cooling phase of approx. 1 1/2 hours.

Mechanical hazards

WARNING!
All moving parts of the vacuum pumps such as, for example, drive belts, fan blades, shafts and rotors, must never be touched while they are in operation and may only be touched once the unit has been switched off and has come to a complete halt.
Warning: the pump runs on!
Risk of injury from moving parts!
Disconnect electrical installations or equipment before working on them. Lock any main or emergency stop switches to prevent them from being switched on again and put up a warning sign.

WARNING!
Never reach into the openings in the pump unit while it is in operation. The extremities may be sucked in because of the prevailing lower pressure in the system.
Risk of injury through reaching in or being dragged into the vacuum system!

Noise emission

Because of their structure, rotary vane vacuum pumps can achieve a high noise level during operation.

They should therefore be installed in separate machine rooms.

The entrance door to these should be provided with warning signs, “”Wear ear protection”, in accordance with ISO 3864 / EN 50099.

Wear ear protection!
Damage to or total loss of hearing is possible as a result of staying in the direct area of the pump unit for a long time.

2.4 Personnel qualification

All personnel who perform work on or with the product must carefully read and understand the instructions and act in accordance with them!

- In principle, all work on electrical equipment and electrical connection work should only be performed by trained electricians.
- In principle, any work on hydraulic and pneumatic equipment may only be carried out by specialist personnel who have received the necessary training.
- In principle, all welding work should only be performed by trained welders.

3 Description

3.1 Correct applications

The product described has been designed for use in agricultural (mainly milk producing) operations.

The product is intended solely for generating vacuum in milking installations.

Any applications that are not listed here are not part of the intended purpose and are therefore considered as improper use!

The manufacturer/supplier is not liable for any resulting damage. The user alone bears the risk.

Correct use also includes reading the instructions and observing the inspection and maintenance conditions.

- The manufacturer expressly points out that only original parts and original accessories have been adapted, tested and authorized for use with the product.
- The installation or use of products from other manufacturers may affect the specified properties of the original parts and lead to injury to people and animals.
- The manufacturer does not accept any liability for injury to people or animals, or damage to the product, caused by the use of products from other manufacturers.

3.2 Changes to the product

For safety reasons, do not carry out any unauthorized changes!

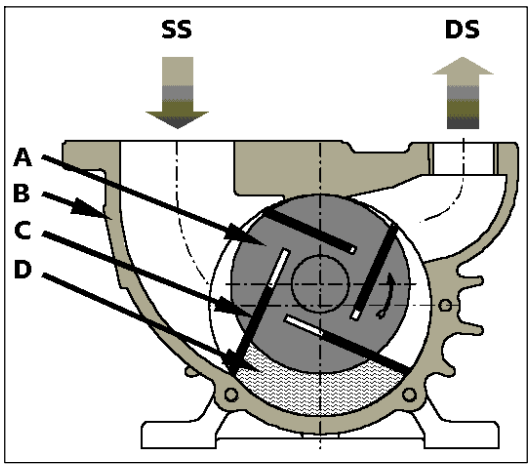
Any planned changes must be approved by the manufacturer in writing.

Parts and special equipment obtained from elsewhere must have been expressly authorized by the manufacturer in writing.

3.3 Functional description

A vacuum pump in the RPS range consists of an oil-lubricated multiple-cell rotary vane vacuum pump and belongs to the rotating positive displacement type of vacuum pump.

These pumps are designed for air as the pumping medium.



Rotary vane vacuum pumps consist mainly of:

- rotor (A)
- Pump housing with end shield (B)
- Pump vanes (C)

The vanes separate the displacement chambers from each other. Vacuum pumps in the RPS series each have 4 displacement chambers. The rotor is positioned eccentrically in the pump housing.

During rotation, the centrifugal force causes the thick end of the pump vanes, which are arranged so that they can slide tangentially in the rotor, to press on the inside surface of the pump housing. Because of the eccentric arrangement of the rotor, the displacement chambers (D) become larger during the first have rotation.

Air is sucked in at the suction nozzle (SS) because of the under-pressure that occurs. In the next half rotation the volume of the displacement chambers (D) reduces and the air is compressed and pressed out or displaced at the pressure nozzle (DS).

3.4 Technical Data

Typ Pumpensatz	Air flow l/min aL		Pump speed 1/min
	50 kPa	40 kPa	
RPS 400	400	500	1230
RPS 800	800	1000	1180
RPS 1200	1200	1480	1620
RPS 1500	1500	1875	1050
RPS 2100	2100	2625	1440
RPS 2800	2800	3500	1200

Type of pump set	Slide			Fan blades		Electr. power required (kW)
	1-piece	2-piece	Length (mm)	yes	no	
RPS 400		X	100		X	1,10
RPS 800		X	200		X	2,00
RPS 1200		X	200	X		2,80
RPS 1500	X		280		X	3,9
RPS 2100	X		280		X	5,3
RPS 2800		X	325	X		7,20

Type of pump set	Drive motor				
	Type of current		Connection		kW
	3-phase 3–phase	Alternating current	direct	Star delta	
RPS 400	X	X	X		1,1
RPS 800	X		X		2,2
RPS 1200	X		X		3
RPS 1500	X		X		4
RPS 2100	X			X	5,5
RPS 2800	X			X	7,5

Type of pump set	Vacuum tank		Weight (kg)	Sound pressure level dB(A)*)
	30 liter plastic 2 inch	100 liter steel 3 inch		
RPS 400	X		64	79
RPS 800	X		105	80
RPS 1200	X		107	82
RPS 1500	X	X	140	86
RPS 2100		X	180	87
RPS 2800		X	200	87

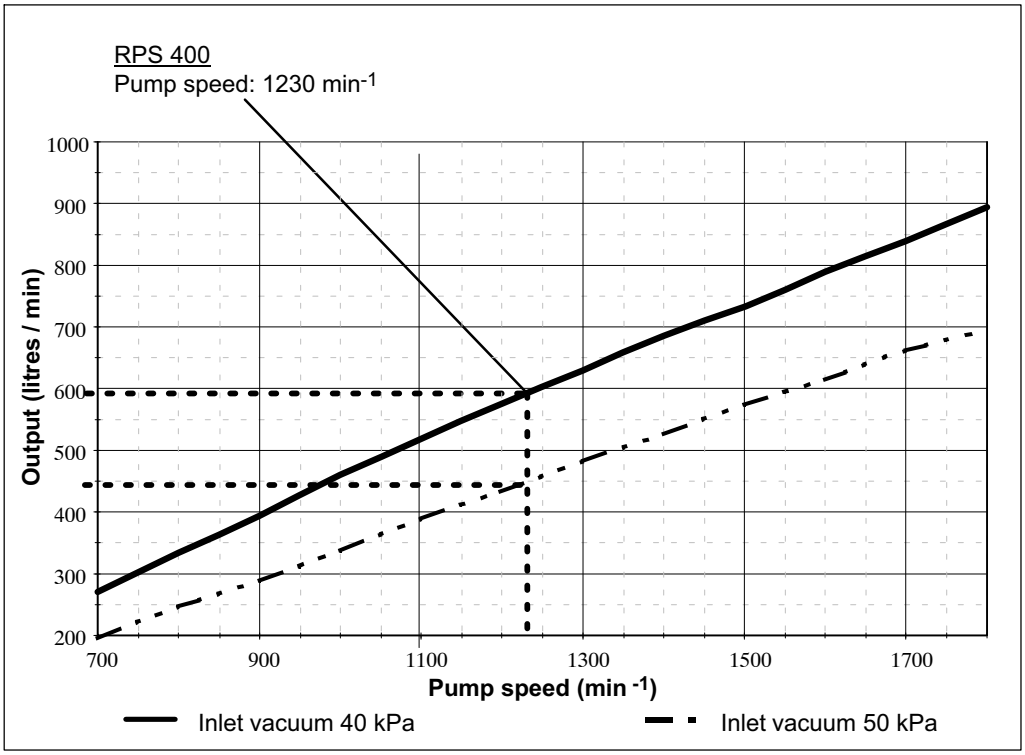
*)
Measuring surface sound pressure level in accordance with DIN 45635 T13, measured 1 m away with an operating vacuum of 50 kPa and pipes connected.

Attention!
The maximum back-pressure allowed in the air vent line according to DIN /ISO and measured at the outlet nozzle of the oil separator at operating vacuum of 50 kPa is 5 kPa for all pumps. If the vacuum is higher, be careful to ensure that the nominal current of the motor is not exceeded (see rating plate on the electric motor).

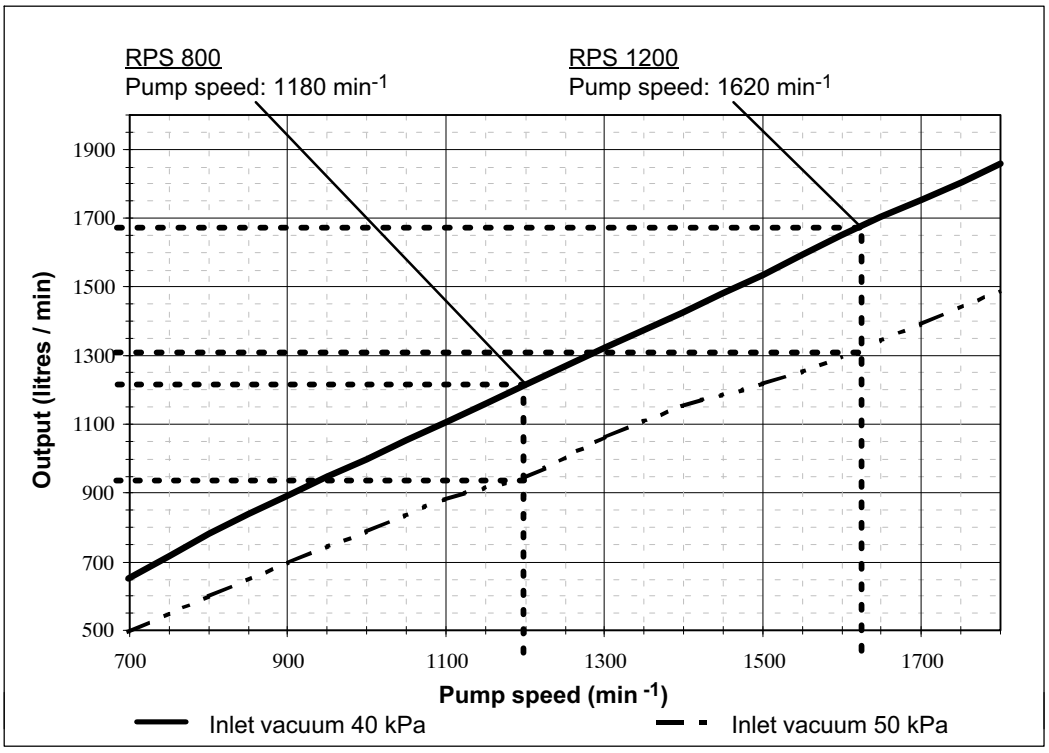
Output according to pump speed

In addition to the standard operating instructions specified by the manufacturer, this pump can also be operated with other speeds.
Please refer to the following diagram in this respect.

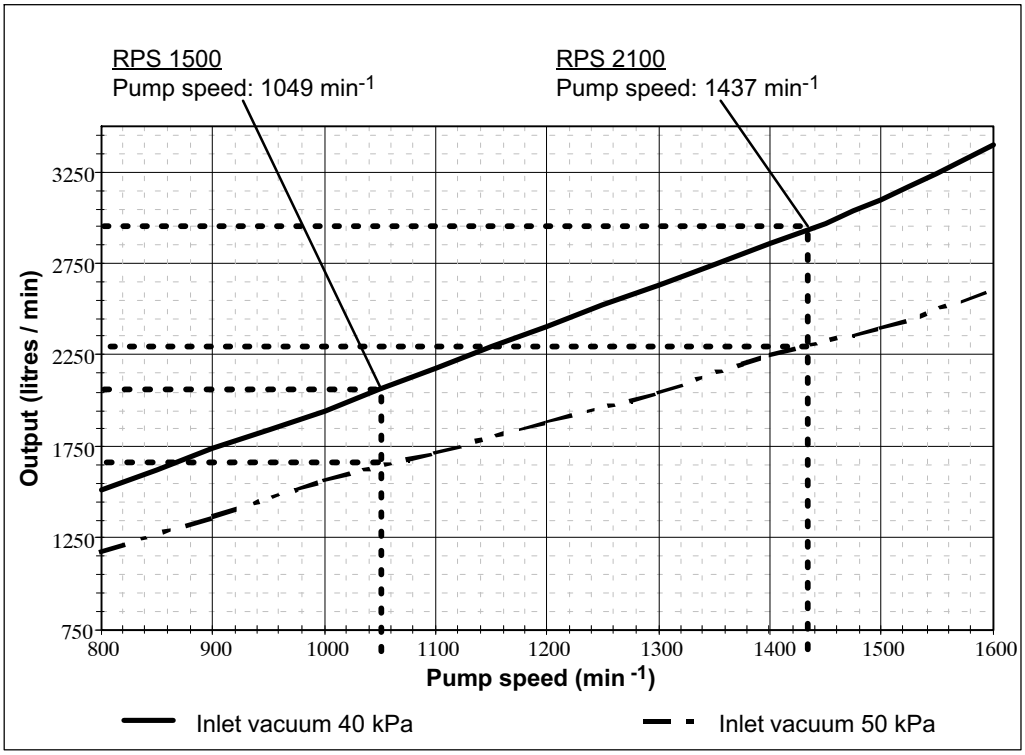
RPS 400



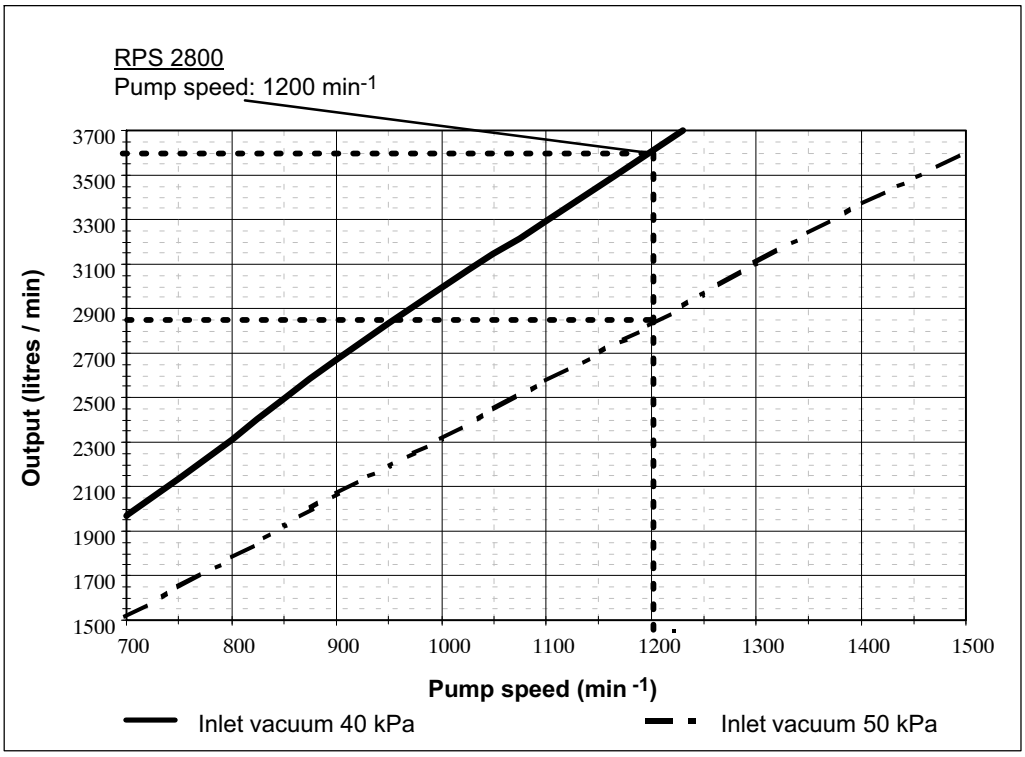
RPS 800 / RPS 1200



RPS 1500 / RPS 2100



RPS 2800



Rating plate

Various information is given on the rating plate.
It is placed on the suction side of the pump.

Example:

GEA Farm Technologies GmbH
D-59199 Bönen (Germany)

Reg. No.:		**LD150001**			
Type: RPS		600	800	1200	
7047-1350-150		1,4	2,0	2,8	kW
Oil:	VCL 22	880	1180	1620	min^{-1}
		600	800	1200	l/min at 50 kPa

For any enquiries on RPS pumps, please give the following details:

- Type designation (e.g. RPS)
- Material number (e.g.. 7047-1350-150)
- Operating range (400 l/min at 50 kPa) and the material number of the delivery note
- Serial number of registration number (e.g. LD150001)

4 Transport

RPS vacuum pump units are delivered to the technical dealers in a packing unit that is suitable for the means of transport (wooden box or carton with pallet). This is also suitable for transport to the end customer.

4.1 Safety instructions for transport

To prevent damage to property and/or life-threatening injury to personnel always observe the following:

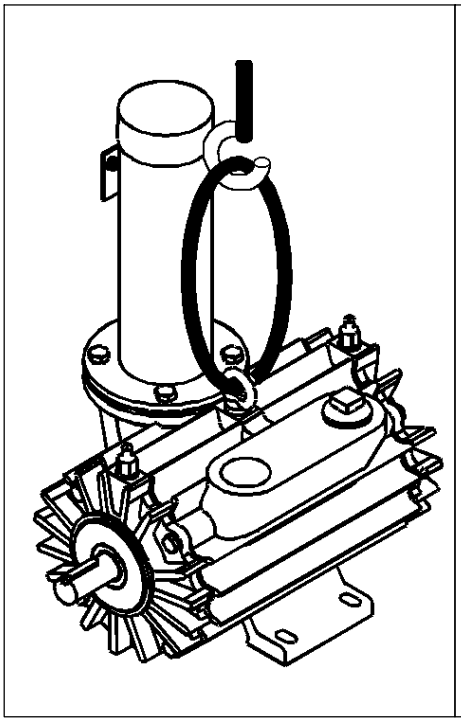

Also read the chapter on ”Safety”.

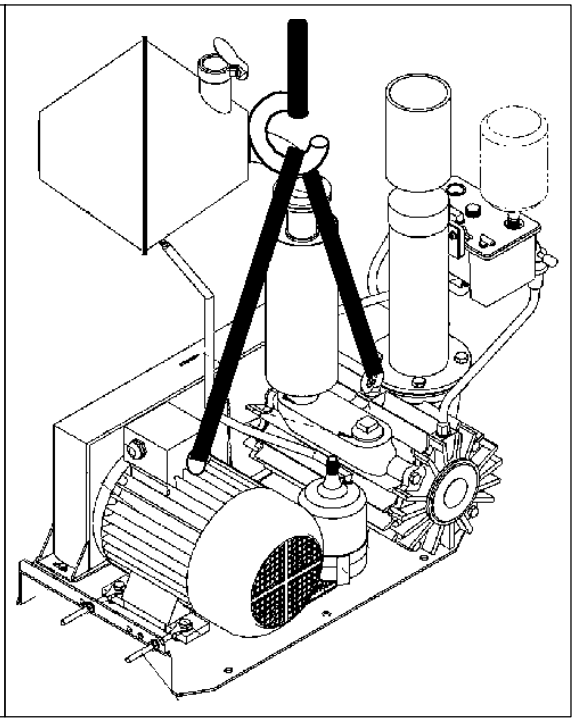
Special transport hazards:

- Projecting sharp edges may cause cuts.
- Suspended loads can fall and then there will be a risk of death - do not stand underneath suspended loads!
- Parts which are stacked too high can collapse.
- There is a fire hazard due to the highly flammable packing material - open flames and smoking prohibited!

4.2 Transport

In the case of pumps and machine sets, the main components (pump and drive) are pre-mounted on the relevant base plates.
So that the pumps/pump sets can be gently taken out using lifting equipment, the two main components, pump and motor (from RPS 800) are each fitted with an eyelet screw at their centre of gravity.





4.3 Includes

Check the goods supplied against the packing list enclosed for completeness and damage.

4.4 Storage conditions

The packing units have labels indicating the corresponding stacking heights.

Attention!
Always observe the stacking heights because no guarantee can be accepted for damage which can be attributed to incorrect storage.

When storing the goods supplied, the location must provide protection against:

- Moisture

Attention!
Storage areas must be dry to avoid rusting!

- External damage (jolts, knocks, rodents, insects, . . .)
- Direct sunlight

Long-term storage

After manufacture, vacuum pumps in the RPS series are subjected to functional testing in the factory. They are therefore ready for immediate use.

If they are to be idle for longer periods or stored for after start-up, for several weeks, months or years, the following steps should be followed:

- Seal off the receiving cone in the cover of the oil reservoir with a plastic stopper!

Attention!
Remove the oil wicks from the storage chamber and place in the central chamber!

- Clean rinse and package vacuum pump to prevent rusting!
- Seal off any air intake nozzles!

4.5 Information on disposing of packing material

After unpacking, the packing material is to be handled properly and disposed of carefully in accordance with the valid local regulations on waste disposal and utilisation.

5 Installation

If necessary, please contact your nearest authorised technical dealer.

5.1 Special personnel qualification required for installation

Installation may only be carried out by specially qualified personnel in accordance with the safety instructions.

5.2 Safety instructions for installation

To prevent damage to property and/or life-threatening injury to personnel always observe the following:

- Observe any national standards and requirements during installation.
  Example:
  Carry out electrical installation work in accordance with the following standards and requirements:
  - EN 60204, Point 14 (Electrical equipment on machines).
  - VDE 0100 (requirements for the erection of power installations).
- Before installation, look for any damage caused during transport. Do not use damaged components!
- Use only the special tool indicated for assembly.
- In particular, make sure that the tightening torques specified are complied with.
- All electrically conductive parts with which the animals might come into contact must be connected to each other and to the installation's protective earth conductor by an additional equipotential bond.
- In the cases of devices with 24 V direct voltage, the power supplies stipulated by the manufacturer and approved for the devices must be used, because the safety of personnel and of the building cannot be ensured otherwise.

 Also read the chapter on "Safety".

Special hazards during installation:

- Injury can be caused by the electrical current from live cable ends and components.
- Lines which are not laid properly (eg bending radius too small) can cause scorching and electrical fires.
- If the bending radius is too small, it should be removed.
- Before working on electrical installations or equipment (components, housings, etc.), they are to be disconnected from the mains.
- Any on/off or emergency stop switches are to be fitted with a lock to immobilise them in the open position and a warning sign is to be put up.

5.3 Environmental prerequisites for setting up

- Do not install in the milk room or barn!
- The location for the pump/pump set/machine set must be well-ventilated and frost-free. The equipment must be installed in a special machine-room. This is to be marked with the following warning sign (to be obtained from a specialist dealer).

Wear ear protectors

Standing area, general

- The standing area must ensure an unhindered supply of cool air for the electric motor and vacuum pump.
- It must be selected so that the whole unit is accessible for checking the amount of oil, servicing and repair and cleaning.
- All accessories (oiler, belt drive, oil trap, oil return bottles, etc.) must be easily accessible.

Standing area, pasture milking installations

- The units must be protected against splashes of water and rain.
- Adequate ventilation must be ensured when in operation.

Standing area, accessories

- It must be possible to clean and empty the vacuum tank without obstruction.

Climate conditions

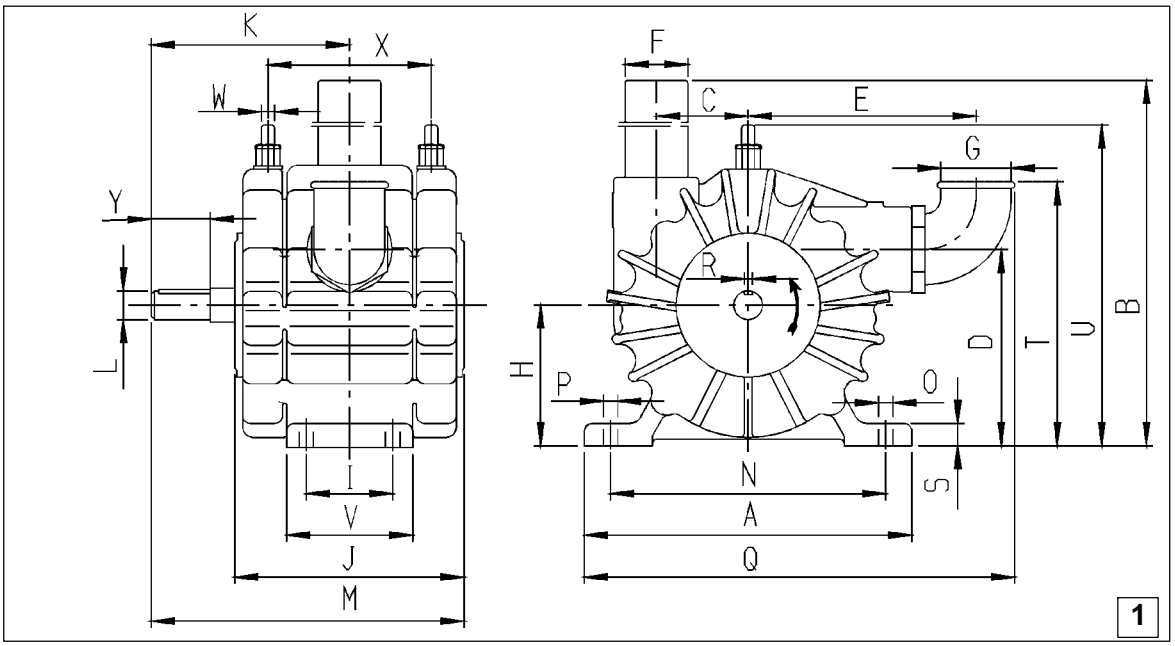
- The pumps are designed to operate in ambient temperatures of between -10 and +50 degrees Celsius.
- The output values given apply with a barometric standard air pressure of 100 kPa and an operating vacuum in the milking installation of 50 kPa.

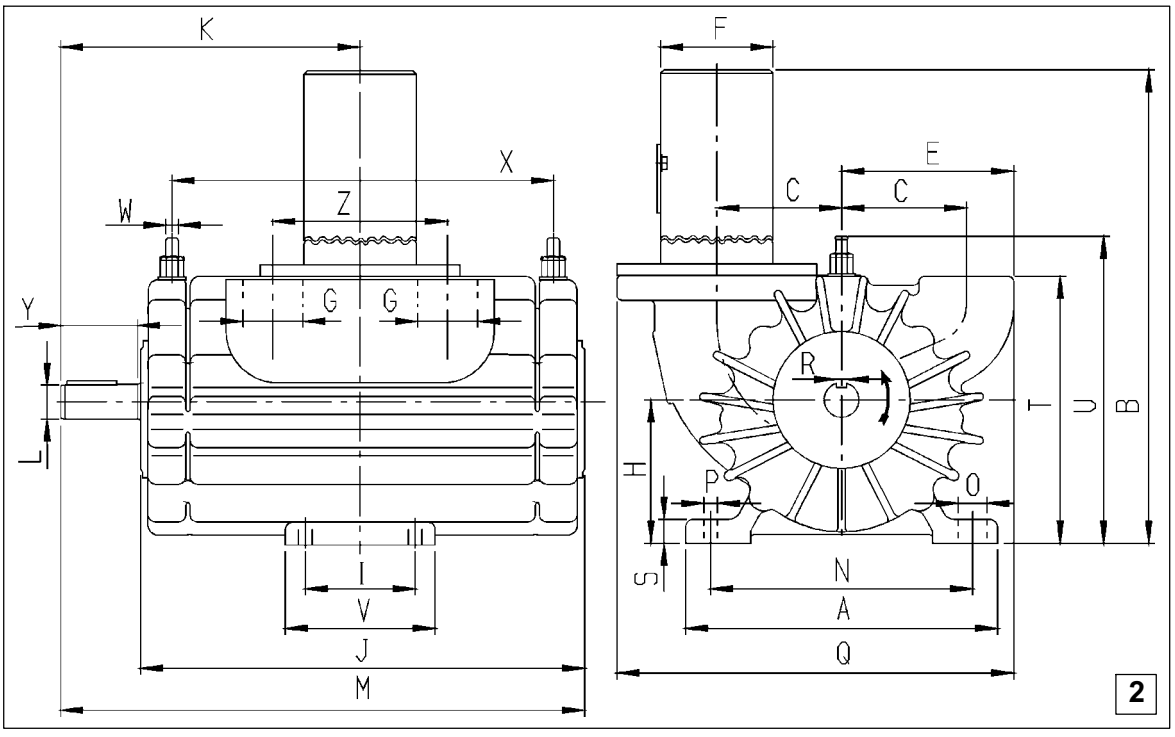
5.4 Vacuum pump compl.RPS 400/RPS 800–1200/RPS 1500–2100/RPS 2800

The following connection dimensions should be observed if the vacuum pumps, compl. are to be used as individual pumps or as replacement pumps.

Figure	Type	A	B	C	D	E	F	G	H	I	J	K	L
1	RPS 400	250	525	70	150	174	⌀ 1 1/2 in	G 1 1/2 in	108	66	175	152	24k6
1	RPS 800-1200	250	525	70	150	174	⌀ 1 1/2 in	G 1 1/2 in	108	88	276	190	24k6
2	RPS 1500-2100	250	457	100	-	138	⌀ 90	G 1 1/2 in	115	88	356	240	28k6
2	RPS 2800	320	560	100	-	138	⌀ 90	G 1 1/2 in	149	200	445	293	30k6

Figure	Type	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
1	RPS 400	240	210	⌀ 11	⌀ 11	330	8N9	17	202	245	96	⌀ 9	125	45	-
1	RPS 800-1200	330	210	⌀ 11	⌀ 11	330	8N9	17	202	245	120	⌀ 9	226	45	-
2	RPS 1500-2100	419	210	23X11	⌀ 11	318	8N9	17	214	246	120	⌀ 9	306	45	140
2	RPS 2800	516	280	⌀ 12	⌀ 12	340	8N9	20	260	268	240	⌀ 9	401	61	140





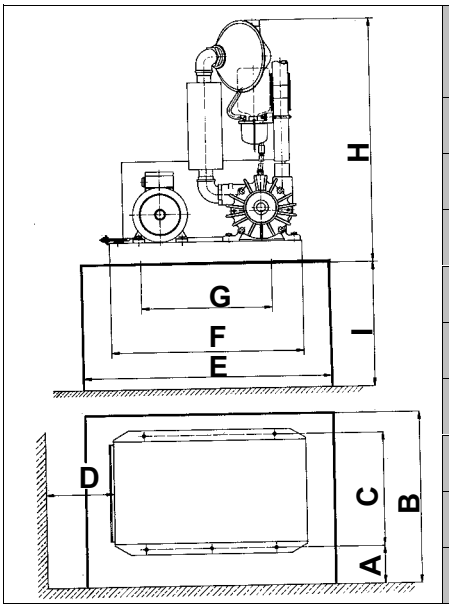
5.5 Pump set, complete

RPS 400 / RPS 800 / RPS 1200 / RPS 1500

These pump sets are suitable for mounting on a level floor and also for wall-mounting. A vibration absorbing base (e.g. concrete) should generally be selected to prevent vibrations and unnecessary noise generation!

Base mounting (mounting on a level floor)

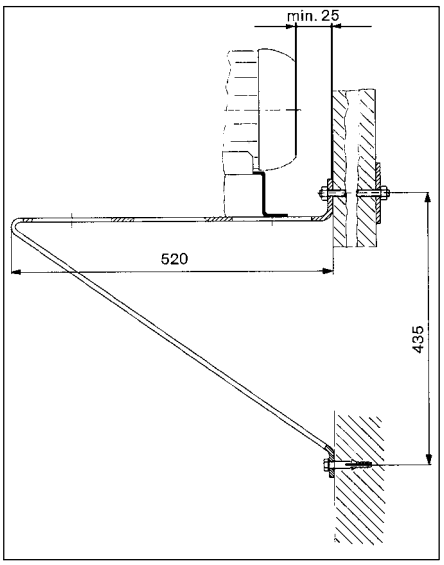
The following dimensions should be observed in order to ensure adequate ventilation for the pump components.



	RPS 400	RPS 800	RPS 1200	RPS 1500
A	75	75	115	115
B	500	500	550	
C	360	360	360	360
D	220	220	220	
E	750	750	750	
F	620	620	620	750
G	420	420	420	620
H	785	900	900	900
I	400	400	400	

Wall mounting

Attention!
When mounting with a wall bracket, the wall must be sufficiently strong. (see weight specifications in the section entitled ”Technical Data”.)

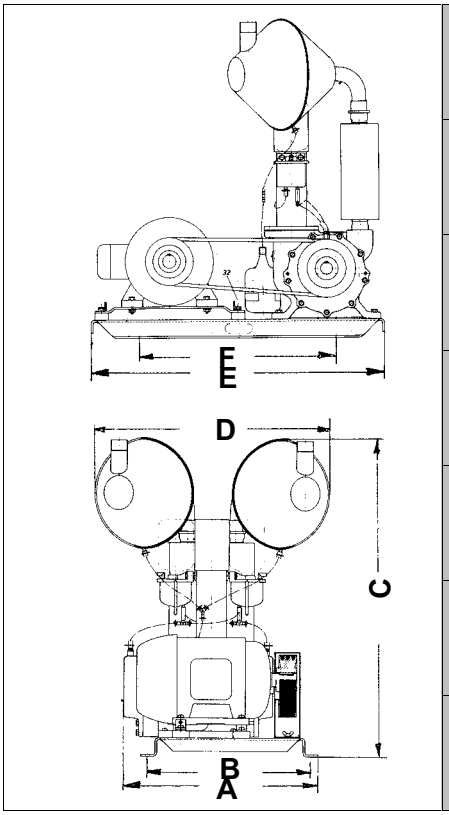


Set of accessories (Wall bracket for RPS 400 to RPS 1200): 7049-9901-060.

RPS 2100 / RPS 2800

Note!
These pump sets are no longer suitable for wall mounting.

The following dimensions should be observed for the base mounting when installing on a level floor!



	RPS 2100	RPS 2800
A	570	570
B	480	480
C	900	900
D	700	700
E	860	860
F	620	620

5.6 Vacuum pump oiler assembly

5.6.1 Lubricating the pumps

When in operation, the main components of RPS vacuum pumps (e.g. bearings, pump vanes, rotor, housing), must be lubricated with oil. The oil acts as a lubricating and sealing agent.

WARNING!
Only use special VCL 22 oil from the vacuum pump manufacturer!
The warranty is nullified if this not observed.
Loss of warranty!

Before putting in the lubricating oil, a few points should be observed:

- There are two basic lubricating principles:
  - Lubricating with fresh oil
  - Circulating lubrication

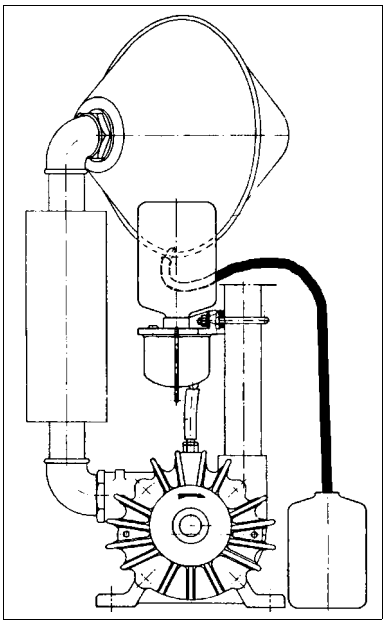
  The pump sets are fitted with semi-automatic lubricating device. They are set in the factory for lubrication with fresh oil.
- Furthermore, two different lubricating methods are used.
  - Wick lubrication
  - Drip lubrication

  When the pump is started up for the first time, it has a higher oil consumption. This is indicated by the oil bottle emptying quickly and occurs because saturation level has not been reached in the oil trap and the rock wool in the silencer.

Lubricating with fresh oil

To build up fresh oil lubrication, the outlet hose from the oil trap is not fed to the oiler's return connection, but into a separating collecting tank.

Because new value oil is used for this one can expect a longer service life with RPS vacuum pumps.



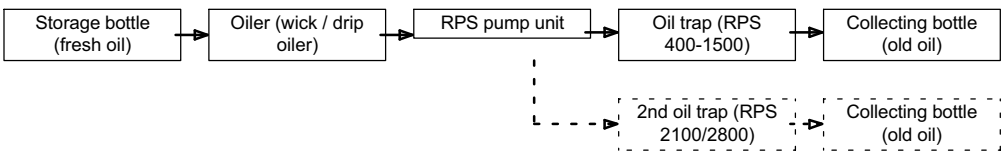
Attention!
Always use fresh oil lubrication if the returning oil can mix with any of the following:

- condensation water
  (especially in the winter because of the higher build-up of condensation water and the lower ambient temperature)
- or milk
  (can be identified by a beige colouring in the return bottle).

WARNING!
Soiled oil must never be reused!
Using soiled oil may result in a shorter service life!

Before start-up, the oil return hose must be connected to the angled inlet connector on the empty oil bottle.

Path of the oil when lubricating with fresh oil



Ventilation

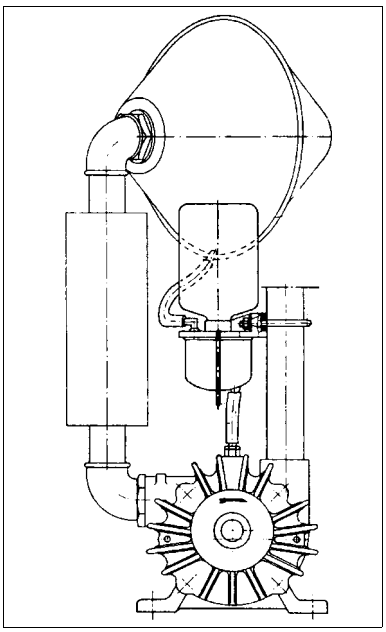
Attention!
To ensure ventilation when in operation the neck of the empty oil bottle must not be sealed!
Risk of soiling

Circulation lubrication

Attention!
It is possible to switch from lubricating with fresh oil to circulating lubrication if the returning oil is free from any soiling.
Using soiled oil may result in a shorter service life!

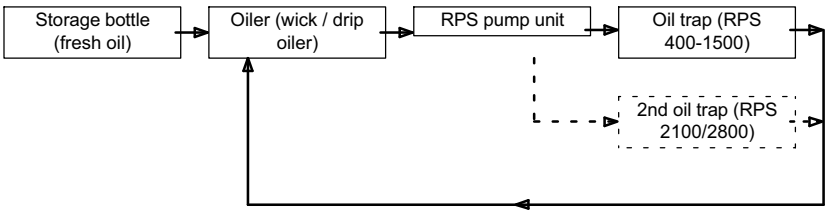
Unlike lubricating with fresh oil, the oil collected by the oil trap is re-used.

The outlet hose from the oil trap is therefore fed to the oiler's return connection.



Before start-up, the oil return hose must be connected to the angled inlet connector on the oiler.

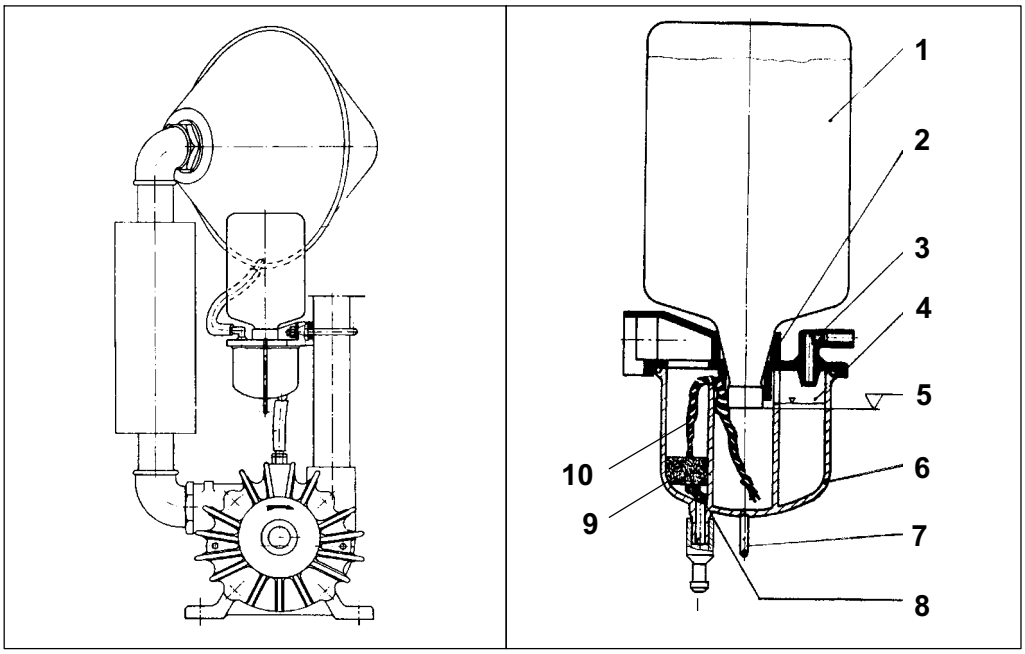
Path of the oil in the case of circulating lubrication



5.6.2 Wick oiler (RPS 400, RPS 800)

> **Note!**
> Please see the operating manual provided for details.

The oiling device is fitted as standard to the intake pipe on the vacuum pump (see diagram).



- Before starting up for the first time, thoroughly soak the oil wicks (10) in oil and place them carefully, together with the filter insert (9), in the wick chamber provided (8)(see diagram).
- Press the oil reservoir (6) beneath the cover (2) and turn until the stop is found. Then fasten the oil reservoir with the clip (7).
- Twist off the seal on the oil bottle (1) and push into the receiving cone. Gently tighten the bottle by turning clockwise.
- Regularly check the oil level (5). If soiling occurs due to fluid being sucked in, clean the oil reservoir at least twice a year.
- With wick oiling the vacuum pumps' oil consumption is an average of 4 to 7 ml per hour of operation. Slight deviations upwards and downwards are possible.

Cleaning the oil reservoir

The oiling wicks (10) and filter inserts (9) should be replaced whenever the oil reservoir is cleaned.

To clean the oil reservoir, first remove the bottle, then take the hoses from the oil inlet connectors and loosen the clip.

Then remove the oil reservoir, flush thoroughly with diesel fuel, rinse and then dry with a clean cloth.

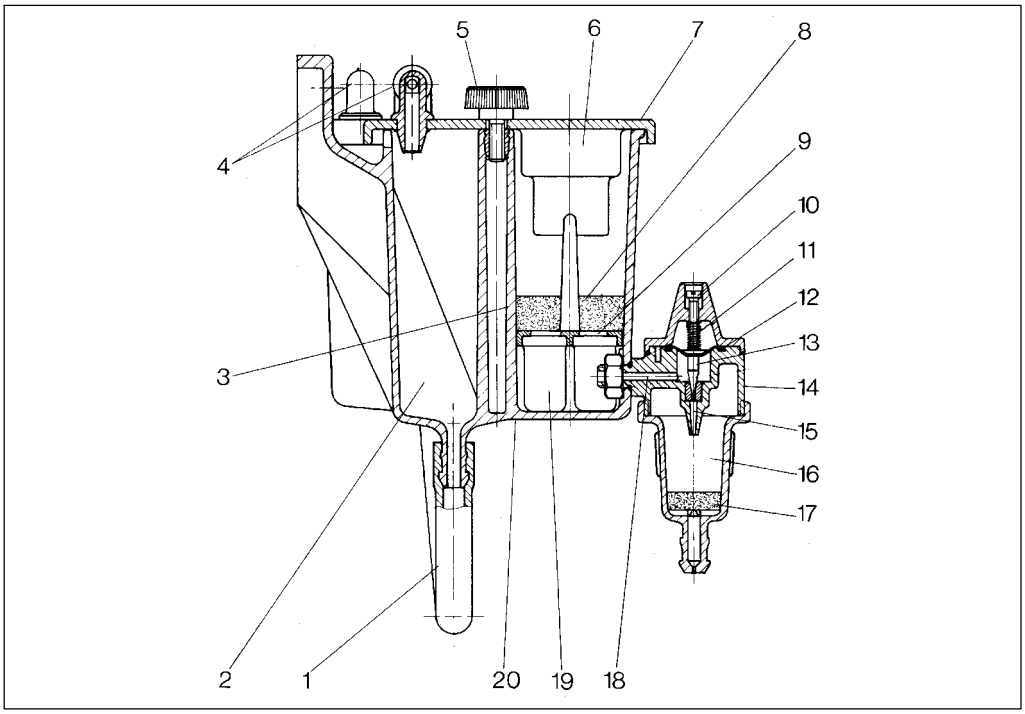
5.6.3 Drip oiler (RPS 1200 - RPS2800)

> **Note!**
> Please see operating instructions accompanying the oiler for details.

This oil regulating arrangement allows a finer dispensing of the oil flow compared to wick oiling.

It is vacuum controlled and therefore only allows the oil to flow when the pump is running.

It is used for vacuum pumps with higher capacity (from RPS 1200) Because finer dispensing then allows more economical operation.



The oil flows into the oil reservoir (20) from the oil bottle(s) placed in the receiver (6).

It flows through the foam filter (8) into the fresh oil chamber (19).

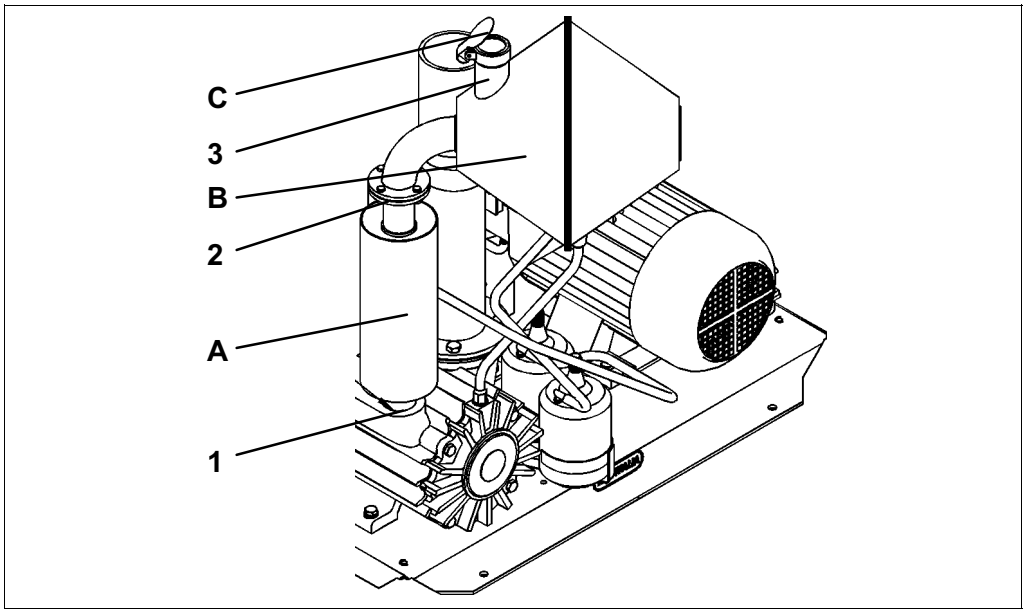
It then goes through the oil regulating valve (14) into the drip chamber (16).

From here, it finally goes through the filter (17) to the pump's oil valves.

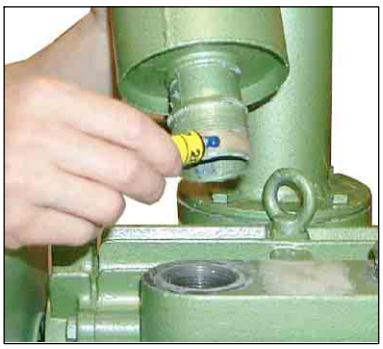
Start-up

> **Note!**
> Start-up is described in detail in the section entitled "Start-up".

5.7 Exhaust gas section(silencer, oil separator, exhaust gas line, non-return valve)



Silencer (A)



The loose silencer provided (from RPS 2100 two silencers are needed), screws into the 1 1/2in thread (1) on the pump's pressure connector or the 90° bend.

Use the sealing compound provided (EPPLE) 7047-9901-050.

Turn the silencer so that the oil trap (B) can be aligned as shown in the figure.

The oil trap must never block access to the intake nozzle.

Check the surface of the upper connecting flange (s) for dirt and clean if necessary.

Oil trap (B)

Mount the oil trap on the connecting flange (2) using the fastening set provided 7046-2165-000 (screws and flat gasket).

Then, using the hoses provided, connect the outlet nozzle beneath the oil trap:

- to the return bottle (lubricating with fresh oil)
- to the oil regulating unit/oiler (circulating lubrication)

Exhaust line

If the pump is installed in a machine room, the exhaust gas section from the end nozzle (3) of the oil separator should be fed to the outside via a separate exhaust line (1 1/2in steel pipe) to avoid heating the machine room and to ensure that the exhaust gases are directed into the open air.

Attention!
The exhaust line must be dimensioned so that the permissible counter-pressure is not exceeded.!

Warning, discharging toxic vapours!
If the pump is installed in rooms or shelters the exhaust gas line must always be led into the open air!
Poisoning hazard!

Note!
Run the exhaust line outside of the building as straight and as far up as possible. Fit the outlet with a non-return valve.
This will further reduce the amount of noise for the surroundings.

Nonreturn valve (C)

When the machine is switched off, there remains a pressure differential at the pump connectors which may result in the pump rotor turning in the opposite direction.

This must be prevented because it might damage the unit and oil might be get into the milk area.

So always use the non-return valve!

WARNING!
The nonreturn valve included must be fitted to the end of the exhaust stub or exhaust line. This stops the pump rotor from reversing when the machine is switched off.
Damage caused by reversing!

5.8 Intake nozzle

When fitting the intake nozzle, thoroughly clean the flange surfaces of the nozzle and the pump.

Then insert the seal and fit the intake nozzle.

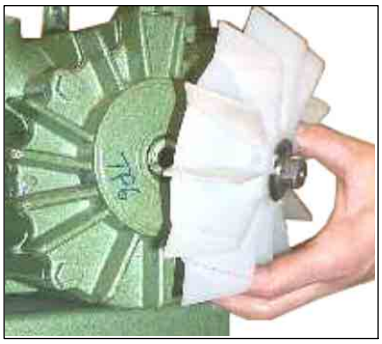
5.9 Auxiliary fan(Option)

Fan sets are available as accessories according to each type of pump if RPS vacuum pumps are to be operated in unsafe temperature conditions (operating temperature above 50 degrees).

This may be the case if the installation site selected does not enable adequate heat dissipation on a continuous basis.

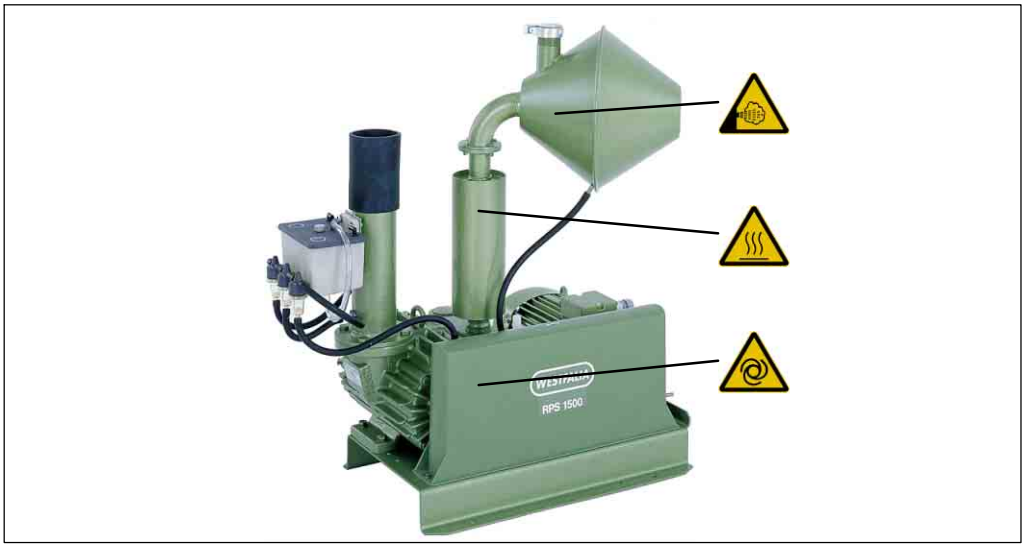
Screw the fan blade together with the shaft extension into the thread of the rotor shaft on the rear of the pump.

The fan cowl provided must then be fitted on the end plate so that a directed flow of air is generated when the pump is operated.



5.10 Applying warning signs and decals

WARNING!
Avoiding personal injury!
To avoid personal injury, the main sources of danger from the unit should be marked with suitable warning signs.



The surface for these adhesive signs should be flat, smooth and without any grease! If there are no suitable surfaces in the direct vicinity of the danger points, preference should be given to the belt guard box. The adhesive signs should be applied in the centre of this so that they are easily visible.

”Warning: Hot surface, do not touch!”

This warning is applied in the factory on the silencer, in the form of an adhesive sign as shown in the example opposite. If this warning is not immediately obvious to the user in the position selected or when the individual pumps are being used, other labels, which can be easily seen, should be applied to the pump unit.
Use the adhesive signs provided for this purpose.

”Warning: hot or harmful gases discharged in the normal working area!”

This warning is applied in the factory on the oil trap near the outlet nozzle, in the form of an adhesive sign as shown in the example opposite. If this warning is not immediately obvious to the user in the position selected or if used with an exhaust gas line, other labels, which can be easily seen, should be applied at the end of the exhaust gas section.
Use the adhesive signs provided for this purpose.

”Warning: The unit is remote-controlled and may start without warning!”

Because the vacuum pump is generally switched on from an external control unit (e.g. by actuating the automatic cleaning units), the pump unit should be marked with the warning shown opposite.
Use the adhesive signs provided for this purpose.

5.11 Supply connections–air line

Use the rubber bushings supplied to connect the vacuum pump to the central air or vacuum line of the milking installation.

Additional reducing adapters are available according to the different connection alternatives.

Vacuum pump	Connection
RPS 400	1 1/2 in pipe
RPS 800 / RPS 1200	2 in pipe
RPS 2800	3 in pipe

5.12 Electrical installation

Electrical connection

According to legal provisions and to protect against electric shock, installation may only be carried out by an electrician in accordance with local requirements.

WARNING!
Electrical installation may only be performed by an electrician!
Electrical hazard!

Potential control (VDE 0 100, PART 705)

Potential control must be connected separately on the air line and machine set!

Supply to electric motor

- Fit a motor protecting switch or motor control unit.
  The motor protecting switch must be fitted with an thermal instantaneous tripping device for over-current and a magnetic instantaneous tripping device for short-circuit.
- Set protective motor switch to rated current (see rating plate for the electro-motor).

WARNING!
From machine set RPS 2100 (5.5 kW motor) fit a star delta switch!

Protective motor switch

By automatically switching off, the motor protecting switch indicates the faulty operating condition:

- motor overload
- overvoltage in the mains

WARNING!
The vacuum pump's electric motor may be damaged if the motor protecting switch is not fitted correctly or is not installed.
Loss of warranty!

5.13 Information on disposing of installation material after installation is finished.

Handle unused installation material properly and dispose in accordance with current valid local regulations on waste disposal and utilization.

6 Initial Commissioning

6.1 Special personnel qualification required for initial commissioning

Initial commissioning may only be performed by specially qualified personnel in accordance with the safety instructions.


Also see the section on ”Personnel qualification”.

6.2 Safety instructions for initial commissioning

To prevent damage to property and/or life-threatening injury to personnel always observe the following:

- Before starting for the first time, check that all tools and other parts have been removed from the danger area.
- Activate all safety equipment and emergency-off switches before commissioning.
- Check the direction of rotation of the motor before commissioning.
- Check that all of the operating media are suitable, present and connected.


Also read the chapter on ”Safety”.

Special risks involved in initial commissioning:

- Incorrectly wired connections may destroy electrical/electronic components.
- Defective connections can cause the product to start up unexpectedly or make uncontrolled movements.
- Connections that have been mixed up will cause the motor to run in the wrong direction - which may cause serious damage to property and/or life-threatening injury to people.

6.3 Enter basic settings

With the vacuum pump switched on (after it has been running for approx. 45 min.) set the number of drips at the regulating screw (10) for each oil regulating valve in accordance with the following table.

Type of vacuum pump	Number of regulating valves	Number of drips* per minute and regulating valve	Total oil consumption in ml/h
RPS 1200	2	4	9,1
RPS 1500	3		13,7
RPS 2100			
RPS 2800			
All consumption values should be considered as average values. Slight deviations upwards and downwards are possible.			

WARNING!
The ”number of drips per minute and regulating valve” are given as a factory recommendation. Lower values are not permitted for reasons relating to the operating safety of the vacuum pump.
Breakdown due to too little lubrication!

The oil regulating valves are set in the factory to approx. 4 drips per minute for an average oil temperature of approx. 20 degrees Celsius.

If the ambient air around the oil regulating device is subject to severe temperature changes (summer and winter), resetting will then be required.

Attention!
If the setting for the oil regulating valves remains the same:

- cooler ambient air results in fewer drips of oil
- warmer ambient air results in more drips of oil.

6.4 Commissioning

Lubricating the pumps

When the pump is started up for the first time, it has a higher oil consumption. This is indicated by the oil bottle emptying quickly and occurs because saturation level has not been reached in the oil trap and the rock wool in the silencer.

Before start-up, the oil return hose must be connected to the angled inlet connector on the empty oil bottle (fresh oil lubrication) / oiler (circulating lubrication)..

Wick oiler (RPS 400, RPS 800)

- Before starting up for the first time, the oil wicks (10) should always be soaked with oil and, together with the filter insert (9), carefully placed in the wick chamber (8) provided (see also the section entitled ”Installation”).

Drip oiler (RPS 400 - RPS 2800)

In the factory the oil regulating device is started up at the same time as the pump. The following measures should be taken if the regulating device has not already been put into operation.

- Remove knurled screw (5) from the oil reservoir cover (7).
- Remove oil reservoir cover (7).
- Press foam filter (8) gently against the mesh insert (9). The foam filter (8) must lay evenly on the mesh insert (9) which in turn lays all around the edge of the fresh oil chamber (19).
- Place cover (7) on the oil reservoir (20) and fasten with knurled screw (5).
- Remove the protective caps from the receiving openings (6) in the oil reservoir cover (7).
- Place the oil bottle with open neck into the receiving opening(s) (6) and fasten by turning in the clockwise direction.
- With the vacuum pump switched on (after it has been running for approx. 45 min.) set the number of drips at the regulating screw (10) for each oil regulating valve in accordance with the table, ”Setting number of drips”.

☞ **Note!**
Detailed information on starting up the drip oiler is given in the corresponding operating instructions.

7 Operation

Because the vacuum pump is generally switched on from an external control unit (e.g. by actuating the automatic cleaning units), the vacuum pump starts automatically.

8 Operating faults

If necessary, please contact your nearest authorised technical dealer.

8.1 Special personnel qualification required for troubleshooting

Troubleshooting may only be performed by specially qualified personnel in accordance with the safety instructions.

8.2 Safety instructions for troubleshooting

To prevent damage to property and/or life-threatening injury to personnel always observe the following:

- First of all, prevent the product from being restarted accidentally.
- Ensure that safe disconnection can be carried out by a second person at any time.
- Secure the range of action for any moving parts.

Also read the chapter on ”Safety”.

Special dangers involved in troubleshooting:

- If energy sources are switched on unintentionally this may lead to serious damage to property and/or life-threatening injuries to people and animals.

8.3 Troubleshooting possible faults

Malfunction	Cause	Remedy
Output too low	V-belts too slack	Tighten V-belts
	Offset between V-belt pulleys	Mount motor and pump so that the V-belts are in true alignment
	Exhaust gas section blocked	Clean exhaust gas section
	Insufficient lubrication (e.g. in the grooves of the pump vanes)	Lubricate
	pump vane inserted incorrectly	Insert pump vanes correctly
	Leaking connections to added-on parts (e.g. intake flange, silencer, rubber bushing, etc.)	Seal all connections with sealing compound so that they are airtight
Inadequate lubrication	Dirty oil channels or hoses	Clean oil channels or hoses
	Vacuum at the nonreturn valves insufficient?	Clean nonreturn valve, clean bearing area if necessary
	The protective covers are not fitted right around and are not sitting tightly on the rotor (only for RPS 1500/2100 / item 210)	Correct the position of the protective cover
	Oil valve fitted incorrectly	Fit oil valve correctly. The first adjustment of the valve must take place at operating temperature.
Running noise	Protective cowl loose	The protective cowl of the extra fan must be fastened so that the fan wheel can run freely. The fastening screws on the fan cowl must be tightened again after a few hours of operation!

9 Maintenance

If necessary, please contact your nearest authorised technical dealer.

9.1 Special personnel qualification required for maintenance work

Maintenance work may only be performed by specially qualified personnel in accordance with the safety instructions.

9.2 Safety instructions for maintenance

To prevent damage to property and/or life-threatening injury to personnel always observe the following:

- Only use original spare parts / original wearing parts / original accessories. In the case of products by other manufacturers it cannot be ensured that they have been designed and produced from the point of view of loads and safety.
- All of the steps involved in the maintenance work must be worked through in the order specified.
- The maintenance work specified in the instructions (adjustment, cleaning, lubrication, inspection, etc.) must be performed at the times specified.
- Also note the special information in this manual for the individual components.
- Only use the media specified.
- All warnings and warning signs must be present and legible.
- Immediately replace any components that are not in perfect condition.

 Also read the chapter on ”Safety”.

- Before performing any work on electrical installations or equipment (components, housing, etc.) switch off all sources of voltage and make sure they cannot be switched back on again. Put up a sign warning against switching them back on again.
  Obey the safety rules:
  - Isolate.
  - Ensure devices cannot be switched back on again.
  - Verify safe isolation from supply.
  - Earth and short circuit if necessary.
  - Cover or enclose any nearby live parts.
- All components have cooled to room temperature

Special risks involved in maintenance work:

- Serious damage to property may occur if incorrect replacement or wearing parts are installed.
- If energy sources are switched on unintentionally, this may lead to serious bodily injury or damage to property.
- There is a risk of injury from components/tools... with accessible sharp edges.
- Lines which are not laid properly (eg bending radius too small) can cause scorching and electrical fires
- Connections that have been mixed up will cause the motor to run in the wrong direction - which may cause serious damage to property and/or life-threatening injury to people.

After completing the maintenance work, check the following:

- The installation values set before the work are not altered by the work (report).
- Any screwed connections that were loosened earlier have been tightened.
- Any guards, cover, lids, sieves, filters, ... that were removed earlier have been put back again correctly.
- All safety devices are working perfectly again.
- Have all of the tools, materials and other equipment that were used been removed from the working area again?
- The working area has been cleaned.
  (possibly to remove any fluids or similar substances that came out of the machine)
- Operation has been checked after maintenance work has been completed or parts replaced. Produce a full test report if necessary.

9.3 Scheduled maintenance responsibilities

Carry out regular checks on electrical equipment:

- Retighten any loose connections
- Replace damaged lines or cables immediately
- Close off any cable openings that are not being used

As far as animal health and milking results are concerned, it is extremly important for the milking installation to be inspected and settings checked on a regular basis.

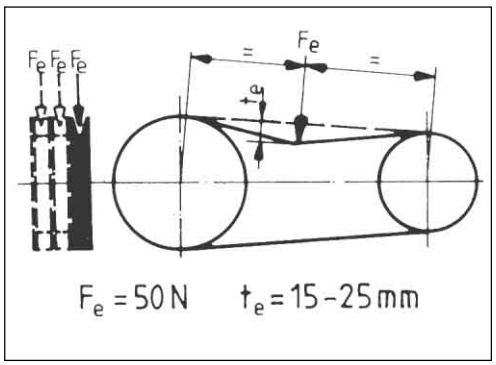
Settings and milking equipment are always to be kept in line with the characteristics of the current herd (milk yield, udder shape etc.). Here are some examples:

- Vacuum level:
  Is the vacuum level set correctly and is the operating vacuum being displayed correctly by the vacuum gauge? Would it be possible to set the operating vacuum at a lower level (gentler milking)?

To ensure a long service life, RPS vacuum pumps should be serviced at regular intervals.

Attention!
The wearing parts indicated in the section on spare parts should be replaced in the regular service after the number of hours of operation specified!

V-belt tension



- If the pump is driven by V-belts, check the pre-tensioning of the V-belts 30 minutes after starting up or after fitting new V-belts, as shown in the figure opposite.
- Check the pre-tensioning of V-belts approximately every 1500 hours of operation.

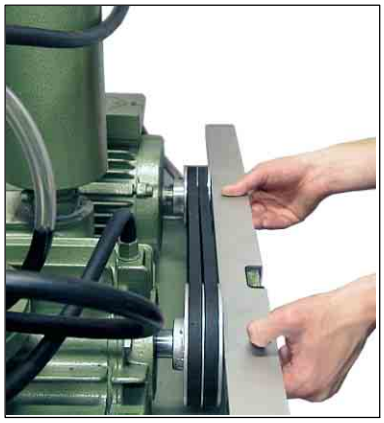
Attention!
With a force (F_e) of 50 N (5 kp) acting vertically in the centre of the V-belt, the deflection should be in the range (t_e) 15-25 mm.

V-belt pulleys

The V-belt pulleys must be aligned.

There must not be any damage in or on the grooves.

The grooves must be clean and free of oil.



Oil reservoir

Interval	Part No.	Description	Action (by)
3000 hours of operation (at least every year)			
	Oil reservoir		
	7050-1799-010	Foam filter	replace / exchange (customer service)
	Oil regulating valve		
	7050-1799-000	Foam filter	replace / exchange (customer service)

Oil regulating device

Check the oil level in the fresh oil bottle, the oil reservoir and the return bottle (if lubricating with fresh oil) every 50 hours of operation.

Make sure oil bottles are replaced in time.

If this is not done, there is a risk of the pump running dry and a risk of pollution due to the return bottle overflowing.

WARNING!
To ensure adequate lubrication, the oil levels and operation of the oil regulating device must be checked every 50 hours of operation.
Change the oil bottles in good time!
Damage caused by running dry!

Oil inlet in end plate

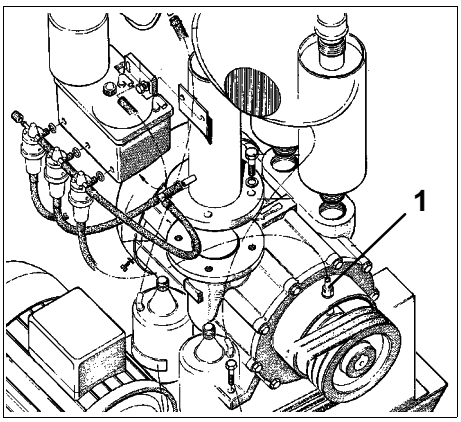
The vacuum at the nonreturn valves in the end plates should be checked by the engineer at regular intervals.

It must not be below 10 kPa.

To do this, separate the hose connection between oil regulating valve and end plate at the connector of the end plate to be checked (1).

Hold up the end of the hose so that no oil can run out.

Now connect PulsoTest to the free end plate connection piece and carry out the measurement.



9.4 Regular cleaning procedures

Wick oiler with circulation lubrication

Because with circulation lubrication compared to fresh oil lubrication, the oil is Constantly becoming more soiled, the oil system should be cleaned more frequently.

WARNING!
The oil reservoir and other components belonging to the lubricating device must be checked or cleaned at least after every 500 hours of operation!
Damage caused by blocked oil channels!

Surfaces and ventilation grille of the extra fan

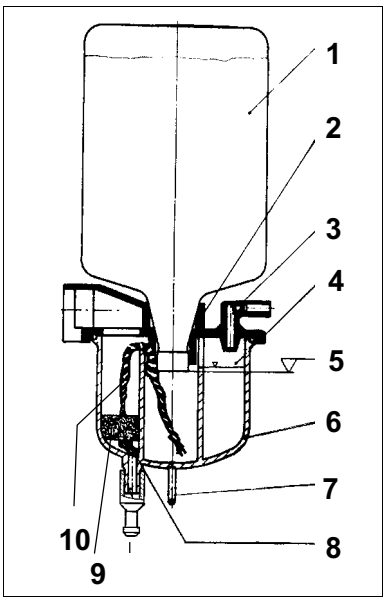
To ensure heat dissipation and avoid unnecessarily high operating temperatures, any coarse dirt should be removed from all surfaces of the pump body. Coarse dirt should also be removed from its ventilation grille if an extra fan is used. This ensures that the pump is adequately cooled.

9.5 Cleaning the vacuum pump

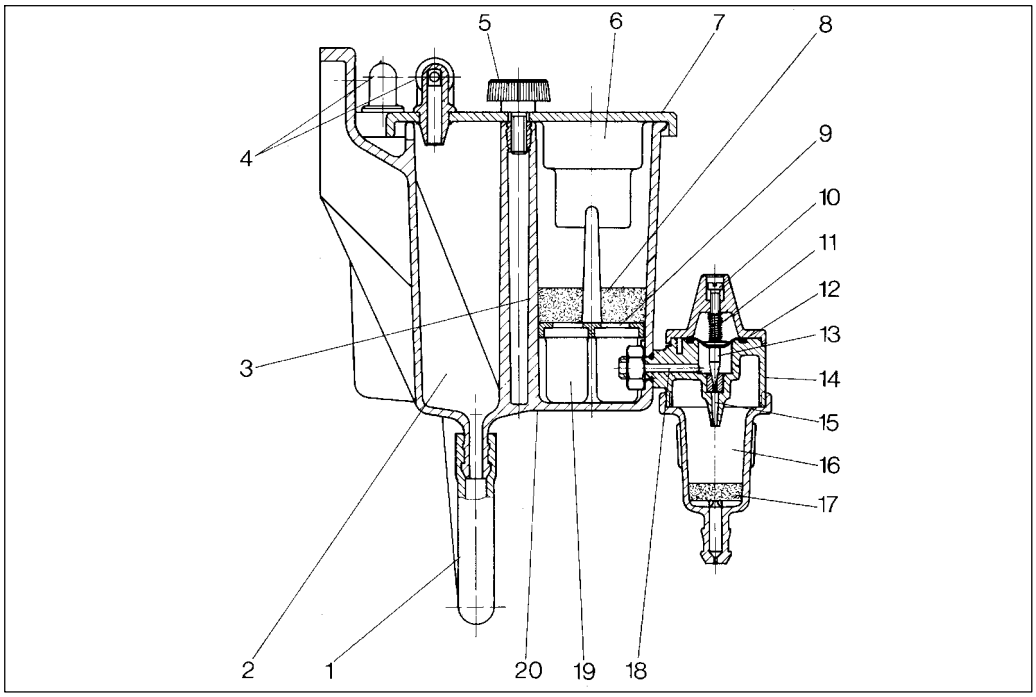
Attention!
Flush the vacuum pump every year!
The vacuum pump must be flushed through at least once a year. This will remove larger deposits. This measure should be carried out several times a year if necessary. The pump must be generating a vacuum while it is being flushed.

Flushing in the case of wick lubrication

- Remove oil wicks from the wick chamber (8) of the oil reservoir (6).
- Hang the oil return hose in a separate container to collect the returning flushing oil.
- Slowly pour 1/4 litre of flushing oil or cold cleaning agent (e.g. chlorothene NU etc.) into the open wick chamber (8).
- Once the flushing oil has been sucked out, apply 1/4 litres of the special oil, VCL 22, to the vacuum pump in the same way.



Flushing in the case of drip lubrication



- Remove the vacuum hose from the side inlet of the oil regulating valve (14).
- Detach inspection glasses from the oil regulating valves.
- Do not pull out the oil outlet hoses.
- Remove foam filter (17).
- Pour 1/8 litre of flushing oil or cold cleaning agent (e.g. chlorothene or similar) into each of the open inspection glasses (16). Pour approx. 1/4 litre of flushing fluid into the middle inspection glass (if there are 3 regulating valves).
- Switch on vacuum pump.
- Once the flushing oil has been sucked out allow approx. one full inspection glass of special oil, VCL 22, to be sucked in.
- Insert new foam filters (17) in the inspection glasses.
- Screw the inspection glasses (16) back onto the oil regulating valve (14).
- Push the vacuum hose onto the side inlet of the oil regulating valve (14).
- Push a new foam filter onto the mesh insert (9).

After rinsing

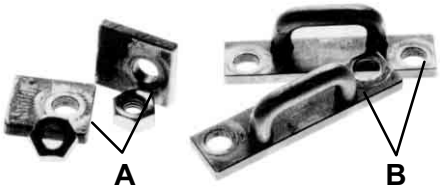
- Connect the oil return hose from the oil trap to the angled inlet on the empty oil bottle.

Produce operating condition

- Allow the vacuum pump to run for approx. 45 min.
- For drip lubrication, then set the number of drips at the adjusting screw (10) for each oil regulating valve (see section entitled ”Settings”).

9.6 Changing the rotor on the vacuum pump

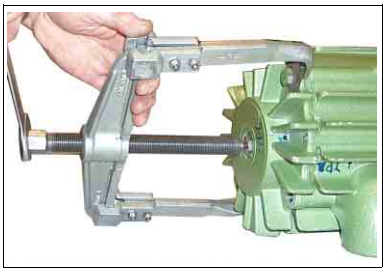
Special tools

Tool set (7047-9900-000) For fitting / removing the rotor A) RPS 400 - RPS 2100 B) RPS 2800	
Driving socket (7047-1026-020) For end plate to release the rotor	
Driving mandrel (7047-9869-000) To dismantle the vacuum pump	

Removal / fitting

Attention!
The rotor must be removed / fitted with the unit lying on its back!

After applying the clips, place the extractor on the end plate (V-belt pulley).



Remove the end plate screws on the V-belt side.

Push out the end plate on the side of the V-belt pulley .

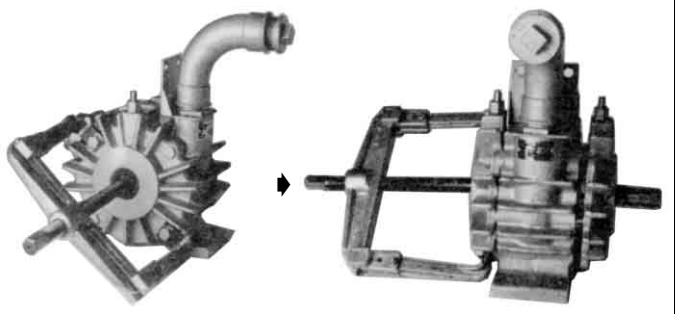
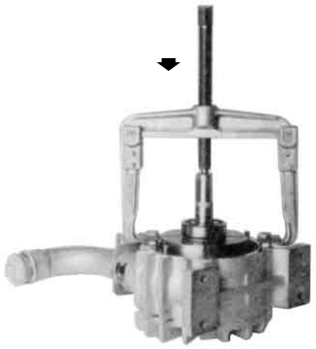
The rotor then slides out of the bearing and housing on the inside surface of the pump housing.

This prevents the rotor knocking the inside surface of the pump housing (because of its eccentric positioning) and causing damage.

When fitting, the rotor is fed through the housing and pressed into the bearing on the fan side.

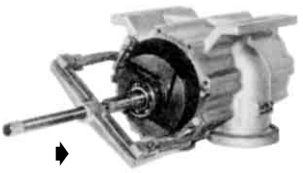
Attention!
When installing, seal the surfaces between the end plate and the housing with Loctite 573 (Material No. 6985-0605-350)!

RPS 400 - RPS 2100

Removal	Fitting
	

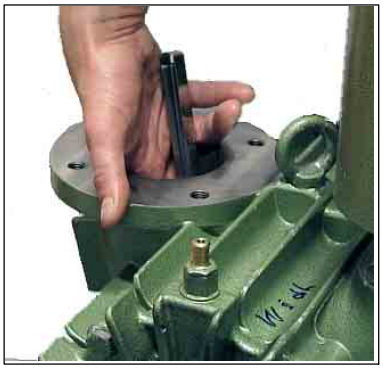
To fit the rotor place an hexagonal nut beneath the clips.

RPS 2800

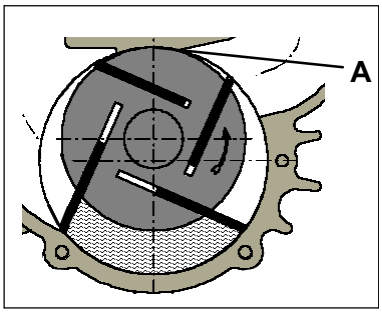
Removal	Fitting
	

Checking the size of the gap

For safe operation and to ensure output, after fitting the pump vanes or rotor, the size of the gap (A) between the rotor and the inside surface of the pump housing must be checked using a feeler gauge.



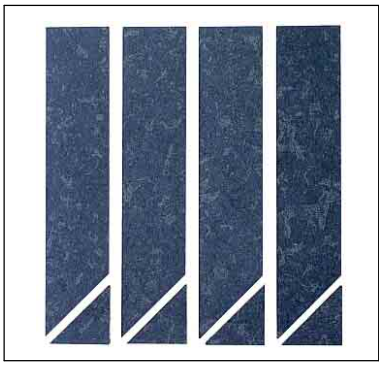
Gap (A):
0.05 mm minimum
0.09 mm maximum



9.7 Changing the pump vanes

The pump vanes can be removed once the rotor has been taken out. They may be extremely tight due to the adhesive effect of the oil. In this case carefully lever the pump vanes out of the grooves using a screwdriver. Take care not to scratch the rotor.

Cover the new pump vanes with oil before inserting them so that there is already a lubricating film before the pump is restarted.



Also make sure that the pump vanes are aligned correctly. They must always be inserted so that they run with the rounded edge against the pump housing.

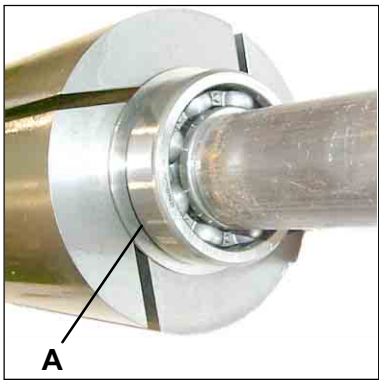
With 2-piece pump vanes, it must also be ensured that the compensating triangles are in the same direction.

9.8 Changing the bearing

Special tools

Extraction device (7047-9970-000) For ball bearings (vacuum pumps up to RPS 2100)	
Driving socket (7047-1026-010) For ball bearings	

Removal / fitting



If the gap (A) between the outside bearing and the rotor is too narrow for a standard extraction tool (RPS 1500-2100), use extraction device 7047-9970-000.

Use driving socket (7047-1026-010) to press on the new bearing.

Make sure that pressure is only applied against the inside ring of the bearing. Otherwise, the bearing may be damaged.

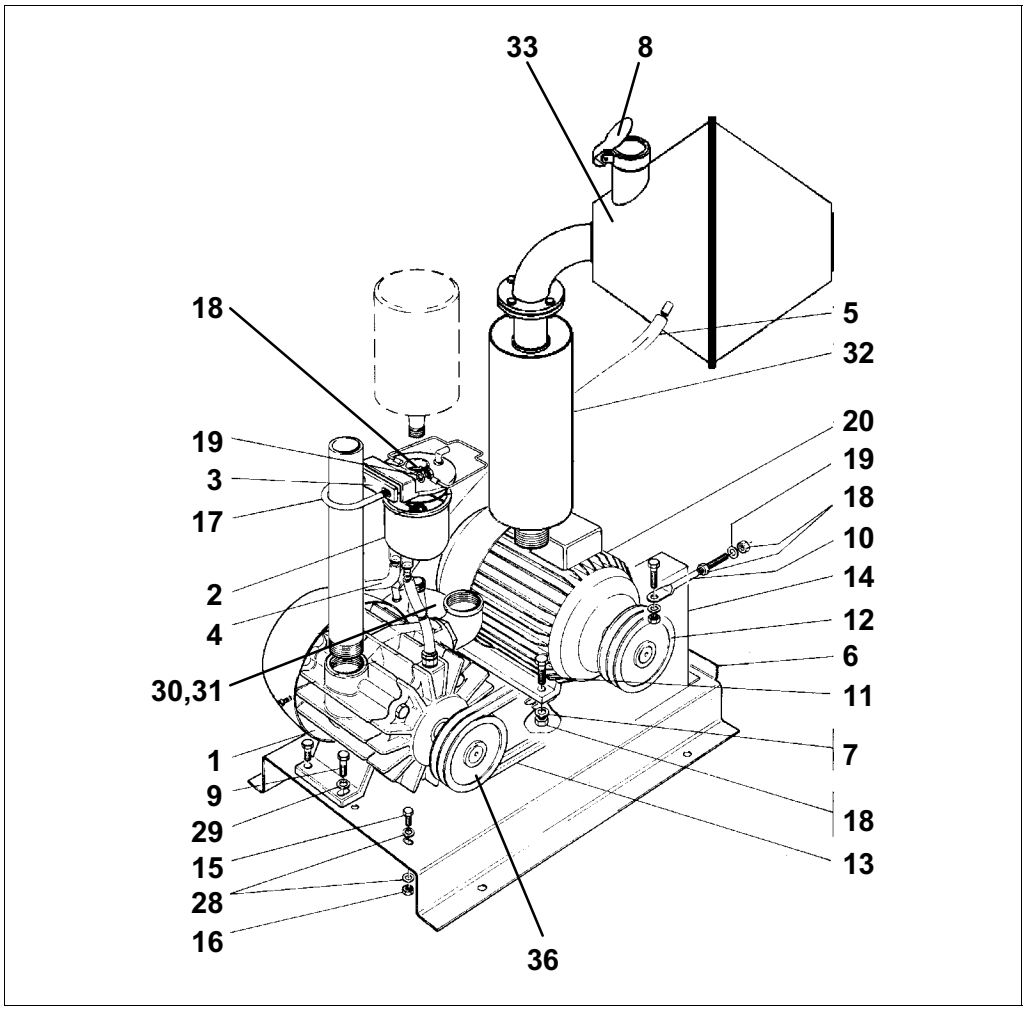
10 Decommissioning

After final decommissioning, handle all components properly and dispose of them in accordance with valid local regulations on waste disposal and utilization.

11 Spare parts

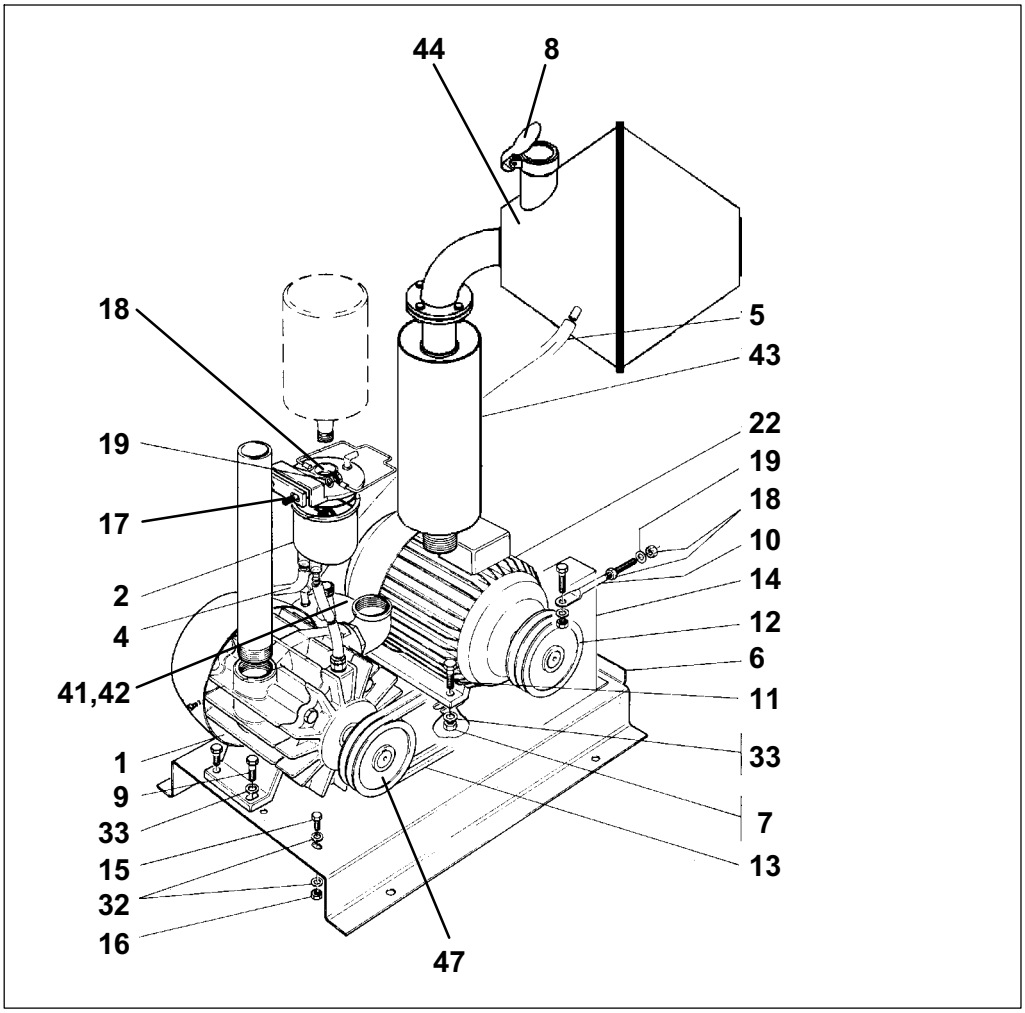
11.1 Pump assembly

Pump assembly “RPS 400”



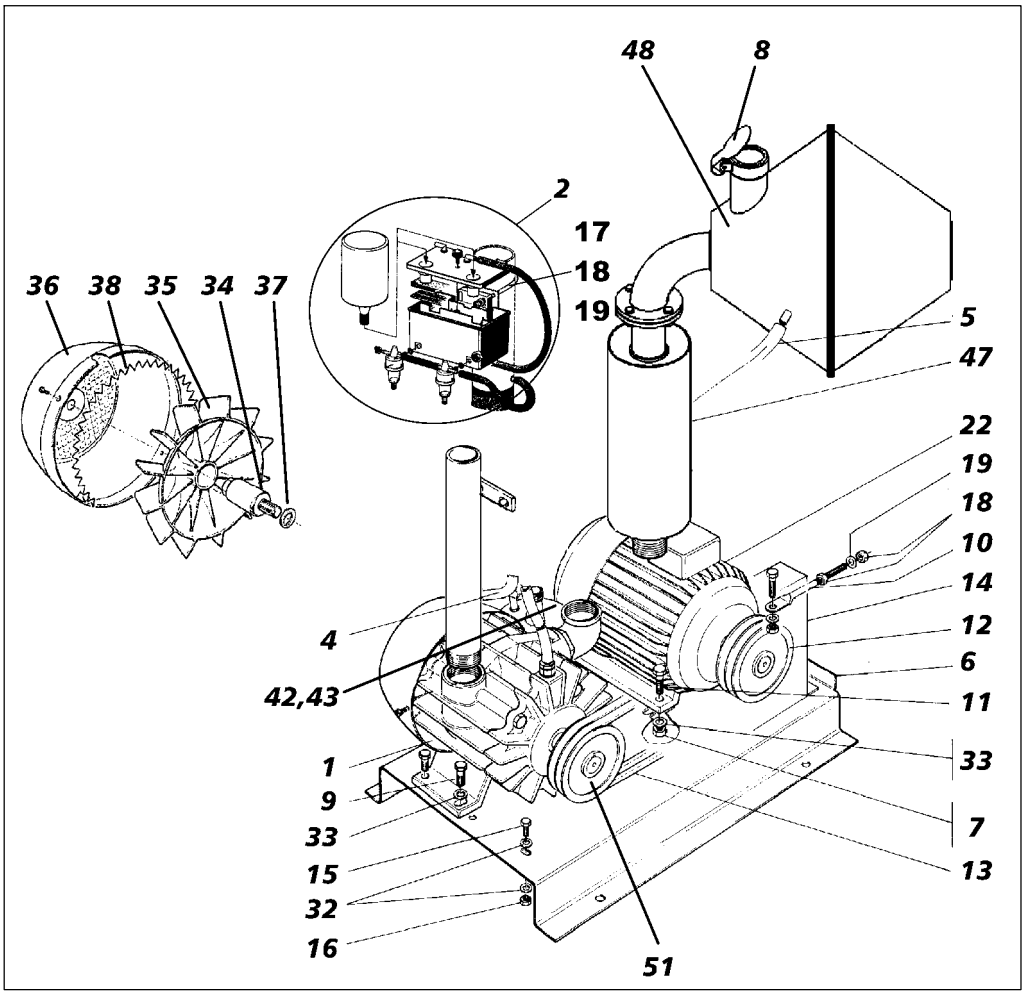
Pos.	Part No.		Description	
	7047-1150-290		Pump set, complete	
0010	7047-1350-150		Vacuum pump compl.	RPS 230-400
0020	7047-1010-030		Oil reservoir, compl.	
0030	7009-3271-070		Fishplate	1-1 1/2in
0040	0018-2629-750	**X**	Hose	6,5x3,25x100
0050	0018-2757-750	**X**	Hose	6,5x3,25x500
0060	7047-1003-080		Base plate	for belt guard boxes
0070	0026-0439-300		Washer	8,4x24x2
0080	7047-1935-020		Nonreturn valve, compl.	
0090	0019-6936-150		Hexagon head bolt	ISO 4017 M10x30
0100	7047-5913-000		Blade screw	M8x135
0110	0019-6907-300		Hexagon head bolt	ISO 4017 M 8 x 30
0120	0021-4022-280		Pulley, compl.	SPA 1T 106x1x24
0130	0021-4337-790	**X**	V-belt	DIN 2215 13x1000
0140	7047-1427-010		Belt guard box	RPS 400-1200
0150	0019-6841-300		Hexagon head bolt	ISO 4017 M 6 x 16
0160	0013-0276-300		Hexagon head nut	ISO 4032 M6
0170	0019-1876-300		U bolt	M 8-1 1/2 in
0180	0013-0278-300		Hexagon head nut	ISO 4032 M8
0190	0026-1345-300		Washer	DIN 125 8,4
0200	5990-4040-326		Three-phase motor	1,1 kW 1500upm
0280	0026-1343-300		Washer	6,2x16x1,5
0290	0026-1348-300		Washer	DIN 125 10,5
0300	0003-0267-800		Oil bottle, compl.	1,0l
0310	7045-2155-020		Stand off bracket	
0320	7047-1344-029		Silencer, welded	
0330	7047-1737-080		Oil trap, compl.	
0340	7046-2165-000		Set of fasteners	
0350	7047-9901-050		Set of accessories	(for sealing)
0360	0021-4023-280		Pulley, compl.	SPA 1T 125x1x24 PN
	0024-5443-000		Sticker	RPS 400
	0024-5220-000		Decal, ”arrow”	40
	0024-6161-020		Name plate	
X - Wear part. Replace after 1500 hours operation during regular service.				

Pump assembly “RPS 800”



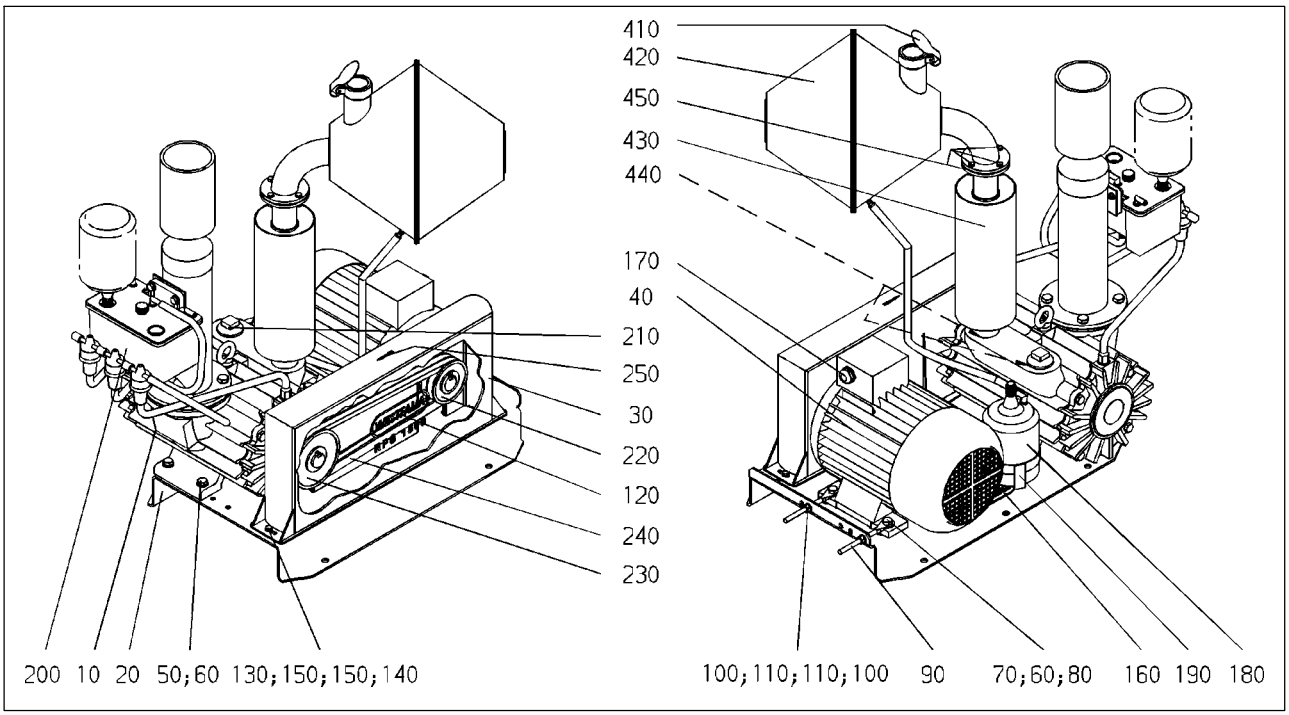
Pos.	Part No.		Description	
	7048-1150-370		Pump set, complete	
0010	7049-1350-150		Vacuum pump compl.	RPS 600-1200
0020	7047-1010-030		Oil reservoir, compl.	
0040	0018-2756-750	**X**	Hose	6,5x3,25x165
0050	0018-2757-750	**X**	Hose	6,5x3,25x500
0060	7047-1003-080		Base plate	for belt guard boxes
0070	0013-0279-300		Hexagon head nut	ISO 4032 M10
0080	7047-1935-020		Nonreturn valve, compl.	
0090	0019-6936-150		Hexagon head bolt	ISO 4017 M10 x 30
0100	7047-5913-000		Blade screw	M8x135
0110	0019-6937-300		Hexagon head bolt	ISO 4017 M10 x 30
0120	0021-4037-280		Pulley, compl.	SPA 1T 95x2x28 PN
0130	0021-4549-810	**X**	Set of small V-belts	DIN 7753 Spa1000lw
0140	7047-1427-010		Belt guard box	RPS 400-1200
0150	0019-6841-300		Hexagon head bolt	ISO 4017 M 6 x 16
0160	0013-0276-300		Hexagon head nut	ISO 4032 M6
0170	0019-6907-300		Hexagon head bolt	ISO 4017 M 8 x 30
0180	0013-0278-300		Hexagon head nut	ISO 4032 M8
0190	0026-1345-300		Washer	DIN 125 8,4
0220	5990-4042-326		Three-phase motor	Imb3 100l 2,2 Kw 1500upm
0320	0026-1343-300		Washer	6,2x16x1,5
0330	0026-1348-300		Washer	DIN 125 10,5
0410	0003-0267-800		Oil bottle, compl.	1,0l
0420	7045-2155-020		Stand off bracket	
0430	7047-1344-029		Silencer, welded	
0440	7047-1737-080		Oil trap, compl.	
0450	7047-9901-050		Set of accessories	(for sealing)
0460	7046-2165-000		Set of fasteners	
0470	0021-3997-280		Pulley, compl.	SPA 1T 112x2x24 PN
0480	0018-2425-700	**X**	Rubber sleeve	58x70x100
0500	7050-2284-000		Stopper	
0510	0018-4944-820		Angle connector	
0520	0026-2253-890		Cap	
0570	0005-0205-900		Screw union	PG16x10-14
	0024-5445-000		Sticker	RPS 800
	0024-5220-000		Decal, ”arrow”	40
	0024-6161-020		Name plate	
X -Wearing part, replace in regular service.				

Pump assembly “RPS 1200”



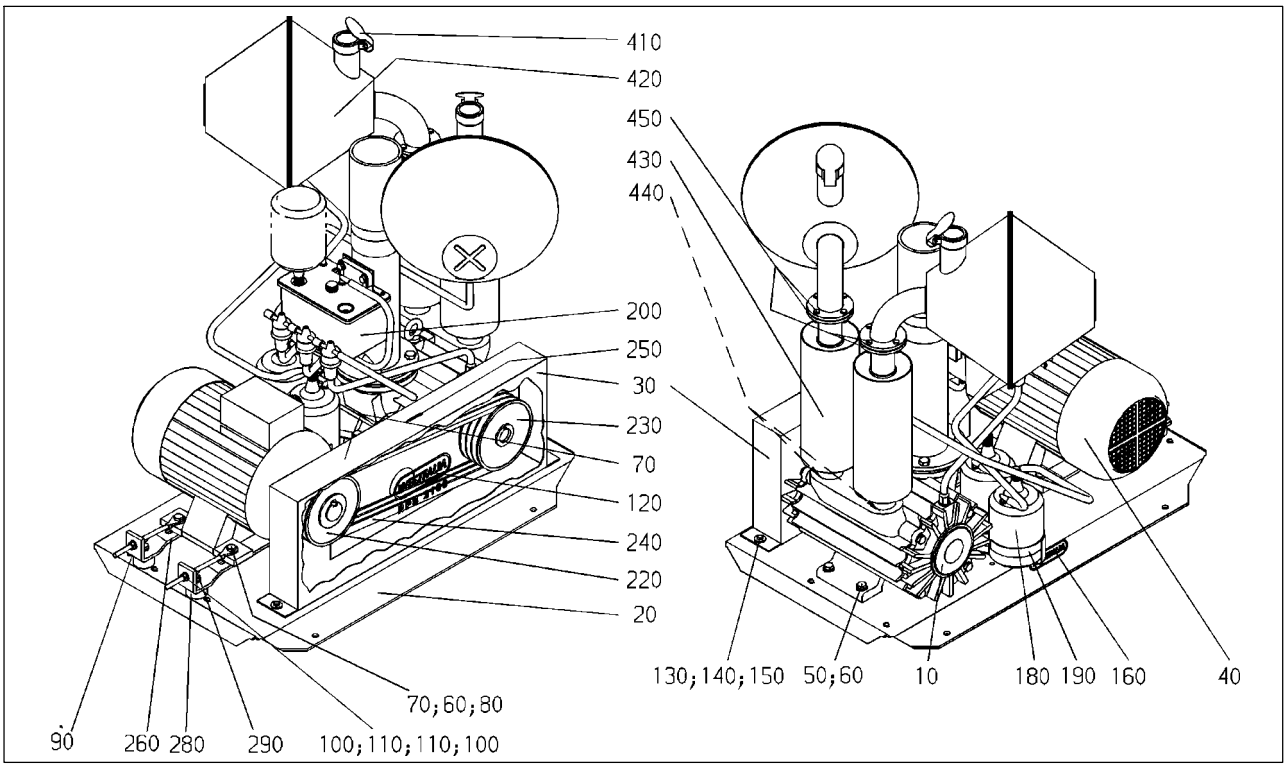
Pos.	Part No.		Description	
	7049-1150-430		Pump set, complete	
0010	7049-1350-150		Vacuum pump compl.	RPS 600-1200
0020	7049-1010-010		Oil reservoir, compl.	
0030	7050-2284-000		Stopper	
0040	0018-2756-750	**X**	Hose	6,5x3,25x165
0050	0018-2757-750	**X**	Hose	6,5x3,25x500
0060	7047-1003-080		Base plate	for belt guard boxes
0070	0013-0279-300		Hexagon head nut	ISO 4032 M10
0080	7047-1935-020		Nonreturn valve, compl.	
0090	0019-6936-150		Hexagon head bolt	ISO 4017 M10 x 30
0100	7047-5913-000		Blade screw	M8x135
0110	0019-6937-300		Hexagon head bolt	ISO 4017 M10 x 30
0120	0021-4038-280		Pulley, compl.	SPA 1T 112x2x28 PN
0130	0021-4549-810	**X**	Set of small V-belts	DIN 7753 Spa1000lw
0140	7047-1427-010		Belt guard box	RPS 400-1200
0150	0019-6841-300		Hexagon head bolt	ISO 4017 M 6 x 16
0160	0013-0276-300		Hexagon head nut	ISO 4032 M6
0170	0019-6907-300		Hexagon head bolt	ISO 4017 M 8 x 30
0180	0013-0278-300		Hexagon head nut	ISO 4032 M8
0190	0026-1345-300		Washer	DIN 125 8,4
0220	7506-2206-000		Three-phase motor	Imb3 100l 3,00kw 1500upm
0320	0026-1343-300		Washer	6,2x16x1,5
0330	0026-1348-300		Washer	DIN 125 10,5
0340	7049-1404-010		Shaft extension	
0350	7049-1309-000		Fan blade, compl.	
0360	7049-1696-000		Ventilator cowl	
0370	0026-5674-170		Serrated lock washer	DIN 6798 J13
0380	7049-1111-000		Guard wire	
0420	7045-2155-020		Stand off bracket	
0430	0003-0267-800		Oil bottle, compl.	1,0l
0440	0018-2425-700		Rubber sleeve	58x70x100
0450	0018-4794-750	**X**	Hose	6,5x3,25x350
0460	0018-4944-820		Angle connector	9
0470	7047-1344-029		Silencer, welded	
0480	7047-1737-080		Oil trap, compl.	
0490	7047-9901-050		Set of accessories	(for sealing)
0500	7046-2165-000		Set of fasteners	
0510	0021-4036-280		Pulley, compl.	SPA 1T 100x2x24 PN
0560	0005-0205-900		Screw union	PG16x10-14
	0024-5446-000		Sticker	RPS 1200
	0024-5220-000		Decal, ”arrow”	40
	0024-6161-020		Name plate	
X -Wearing part, replace in regular service.				

Pump assembly “RPS 1500”



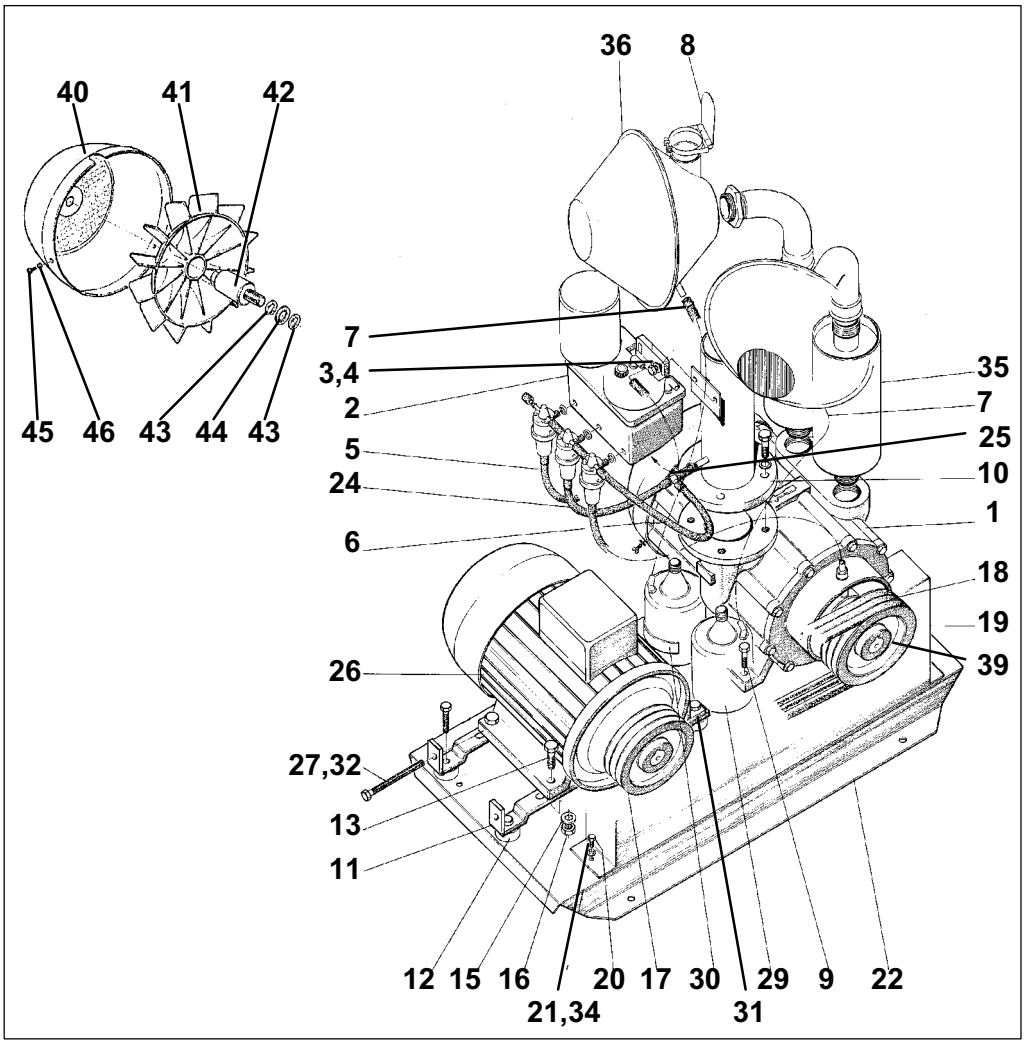
Pos.	Part No.		Description	
	7043-1150-000		Pump set, complete	
0010	7043-1350-000		Vacuum pump compl.	RPS 1500-2100
0020	7047-1003-080		Base plate	for belt guard boxes
0030	7047-1427-010		Belt guard box	RPS 400-1200
0040	7506-2206-010		Three-phase motor	4,00kw 1500upm
0050	0019-6936-150		Hexagon head bolt	ISO 4017 M10 x 30
0060	0026-1348-300		Washer	DIN 125 10,5
0070	0019-6938-300		Hexagon head bolt	ISO 4017 M10 x 35
0080	0013-0279-300		Hexagon head nut	ISO 4032 M10
0090	7047-5913-000		Blade screw	M8x135
0100	0013-0278-300		Hexagon head nut	ISO 4032 M8
0110	0026-1345-300		Washer	DIN 125 8,4
0120	0024-5448-000		Sticker	RPS 1500
0130	0019-6841-300		Hexagon head bolt	ISO 4017 M 6 x 16
0140	0013-0276-300		Hexagon head nut	ISO 4032 M6
0150	0026-1343-300		Washer	6,2x16x1,5
0160	0024-6161-020		Name plate	
0170	0005-0205-900		Screw union	PG16x10-14
0180	0003-0267-800		Oil bottle, compl.	1,0l
0190	7045-2155-020		Stand off bracket	
0200	7050-3200-020		Conversion kit	Oiler RPS 1500-2800 3 off
0210	0018-0994-260		Plug	
0220	0021-3997-280		Pulley, compl.	SPA 1T 95x2x28 PN
0230	0021-3268-280		Pulley, compl.	SPA 1T 132x2x28 PN
0240	0021-3272-810	**X**	Set of small V-belts	DIN 7753 SPA 1000 Lw
0250	0024-5220-000		Decal, ”arrow”	40
0260	6965-0335-340		Palette	490x 800
0270	0026-1388-000		Washer	9x21x1
0280	0019-5576-300		Truss-head screw	DIN 603 M 8 x 30
0300	0024-6172-000		Sticker	Max. stacking height 2
0410	7047-1935-020		Nonreturn valve, compl.	
0420	7047-1737-080		Oil trap, compl.	
0430	7047-1344-029		Silencer, welded	
0440	7047-9901-050		Set of accessories	(for sealing)
0450	7046-2165-000		Set of fasteners	
0470	7043-5003-000		Set of adhesive signs	
X -Wearing part, replace in regular service.				

Pump assembly “RPS 2100”



Pos.	Part No.		Description	
	7043-1150-010		Pump set, complete	
0010	7043-1350-000		Vacuum pump compl.	RPS 1500-2100
0020	7050-1003-010		Base plate	
0030	0021-4272-040		Belt guard box, welded	663x250x75
0040	5990-4046-336		Three-phase motor	Imb3 132s 5,5 Kw 1500upm
0050	0019-6937-300		Hexagon head bolt	ISO 4017 M10 x 30
0060	0026-1348-300		Washer	DIN 125 10,5
0070	0019-6938-300		Hexagon head bolt	ISO 4017 M10 x 35
0080	0013-0279-300		Hexagon head nut	ISO 4032 M10
0090	7047-5913-000		Blade screw	M8x135
0100	0013-0278-300		Hexagon head nut	ISO 4032 M8
0110	0026-1345-300		Washer	DIN 125 8,4
0120	0024-6269-000		Sticker	RPS 2100
0130	0019-6840-300		Hexagon head bolt	ISO 4017 M 6 x 12
0140	0026-1324-190		Spring washer	DIN 127 A 6
0150	0026-1341-300		Washer	6,2x22x2
0160	0024-6161-020		Name plate	
0180	0003-0267-800		Oil bottle, compl.	1,0l
0190	7045-2155-020		Stand off bracket	
0200	7050-3200-020		Conversion kit	Oiler Rps 1500-2800 3 off
0220	0021-4026-280		Pulley, compl.	SPA 1T 140x3x38 PN
0230	0021-3089-280		Pulley, compl.	SPA 1T DIN 2211 140x3x28 PN
0240	0021-4553-810	**X**	Set of small V-belts	DIN 7753 Spa1357lw
0250	0024-5220-000		Decal, ”arrow”	40
0260	7050-1961-020		Tension rail	
0280	7047-1018-030		Shim	
0290	0019-6513-300		Hexagon head bolt	ISO 4014 M10 x 45
0320	7094-9922-000		Set of packing parts	
0410	7047-1935-020		Nonreturn valve, compl.	
0420	7047-1737-080		Oil trap, compl.	
0430	7047-1344-029		Silencer, welded	
0440	7047-9901-050		Set of accessories	(for sealing)
0450	7046-2165-000		Set of fasteners	
0470	7043-5003-000		Set of adhesive signs	
X -Wearing part, replace in regular service.				

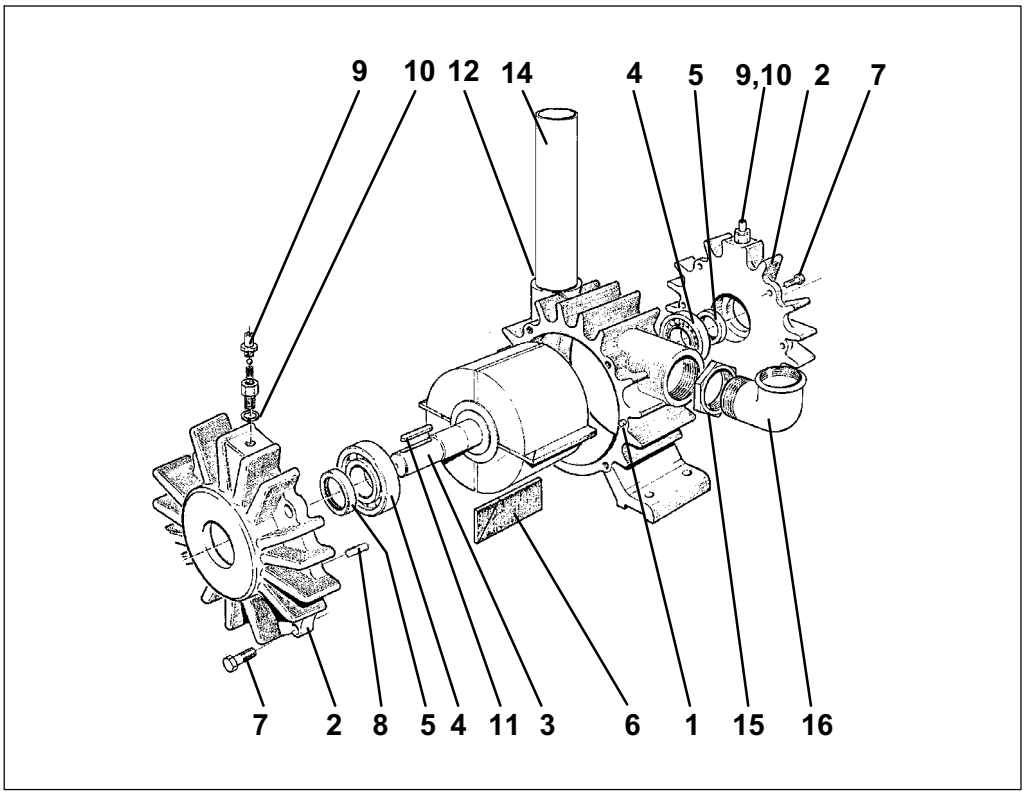
Pump assembly “RPS 2800”



Pos.	Part No.		Description	
	7050-1150-120		Pump set, complete	
0010	7050-1350-060		Vacuum pump compl.	RPS 1500-2800
0020	7050-1010-010		Oil reservoir, compl.	
0030	0026-1345-300		Washer	DIN 125 8,4
0040	0019-6903-150		Hexagon head bolt	ISO 4017 M 8 x 20
0050	0018-2757-750	**X**	Hose	6,5x3,25x500
0060	0018-4791-750	**X**	Hose	6,5x3,25x300
0070	0018-2757-750	**X**	Hose	6,5x3,25x500
0080	7047-1935-020		Nonreturn valve, compl.	
0090	0019-6937-300		Hexagon head bolt	ISO 4017 M10 x 30
0100	0018-3149-820		T-piece for hose connection	
0110	7050-1961-020		Tension rail	
0120	7047-1018-030		Shim	
0130	0019-6938-300		Hexagon head bolt	ISO 4017 M10 x 35
0150	0026-1348-300		Washer	DIN 125 10,5
0160	0013-0279-300		Hexagon head nut	ISO 4032 M10
0170	0021-4026-280		Pulley, compl.	SPA 1T 140x3x38 PN
0180	0021-4501-810	**X**	Set of small V-belts	DIN 7753 Spa1382lw
0190	0021-4272-040		Belt guard box, welded	663x250x75
0200	0019-6840-300		Hexagon head bolt	ISO 4017 M 6 x 12
0210	0026-1324-190		Spring washer	DIN 127 A 6
0230	0024-5514-000		Sticker	RPS 2800
0240	0018-2756-750	**X**	Hose	6,5x3,25x165
0250	7050-2284-000		Stopper	
0260	5990-4048-336		Three-phase motor	Imb3 132m 7,5 Kw 1500upm
0270	7047-5913-000		Blade screw	M8x135
0290	0003-0267-800		Oil bottle, compl.	1,0l
0300	7045-2155-020		Stand off bracket	
0310	0019-6513-300		Hexagon head bolt	ISO 4014 M10 x 45
0320	0013-0278-300		Hexagon head nut	ISO 4032 M8
0340	0026-1341-300		Washer	6,2x22x2
0350	7047-1344-029		Silencer, welded	
0360	7047-1737-080		Oil trap, compl.	
0370	7046-2165-000		Set of fasteners	
0380	7047-9901-050		Set of accessories	(for sealing)
0390	0021-4027-280		Pulley, compl.	SPA 1T 162x3x30 PN
0400	7050-1696-000		Ventilator cowl	
0410	7049-1309-000		Fan blade, compl.	
0420	7049-1404-010		Shaft extension	
0430	0026-1328-190		Spring washer	DIN 127 A12
0440	0026-1371-300		Washer	DIN 125 13
0450	0019-2491-300		Cheesehead screw	ISO 1580 M 5 x 8
0460	0026-1323-300		Spring washer	DIN 127 B 5
	7050-1003-010		Base plate	
	0024-6161-020		Name plate	
X -Wearing part, replace in regular service.				

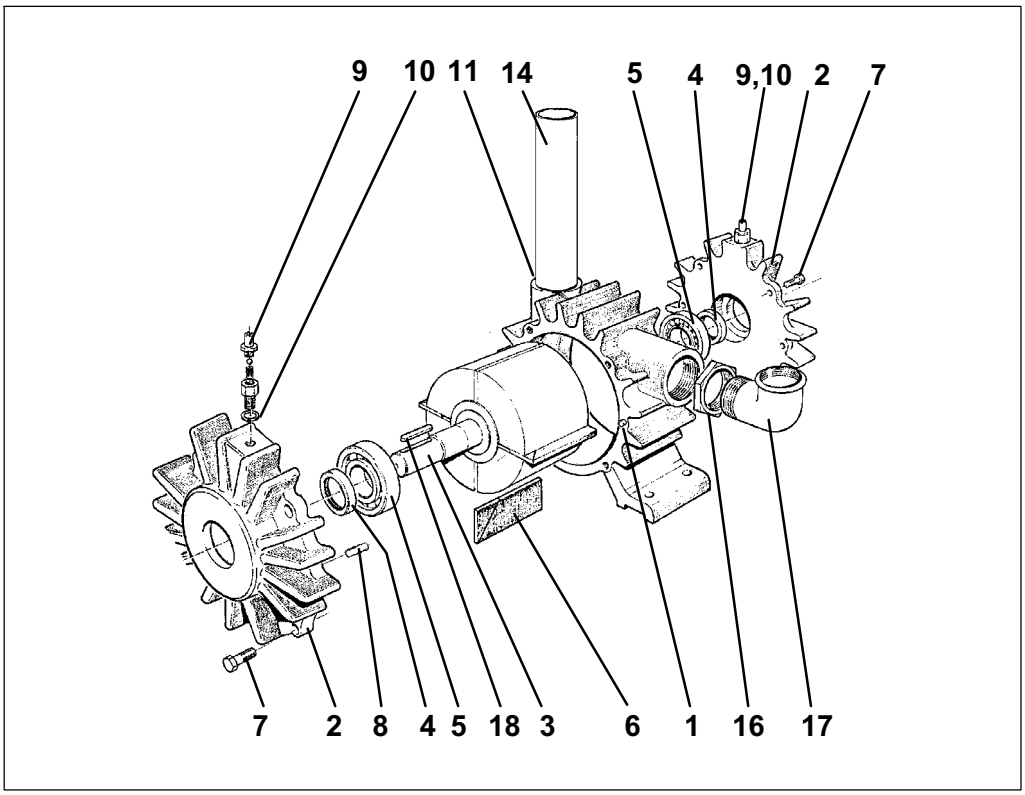
11.2 Vacuum pump compl.

Vacuum pump compl. “RPS 400”



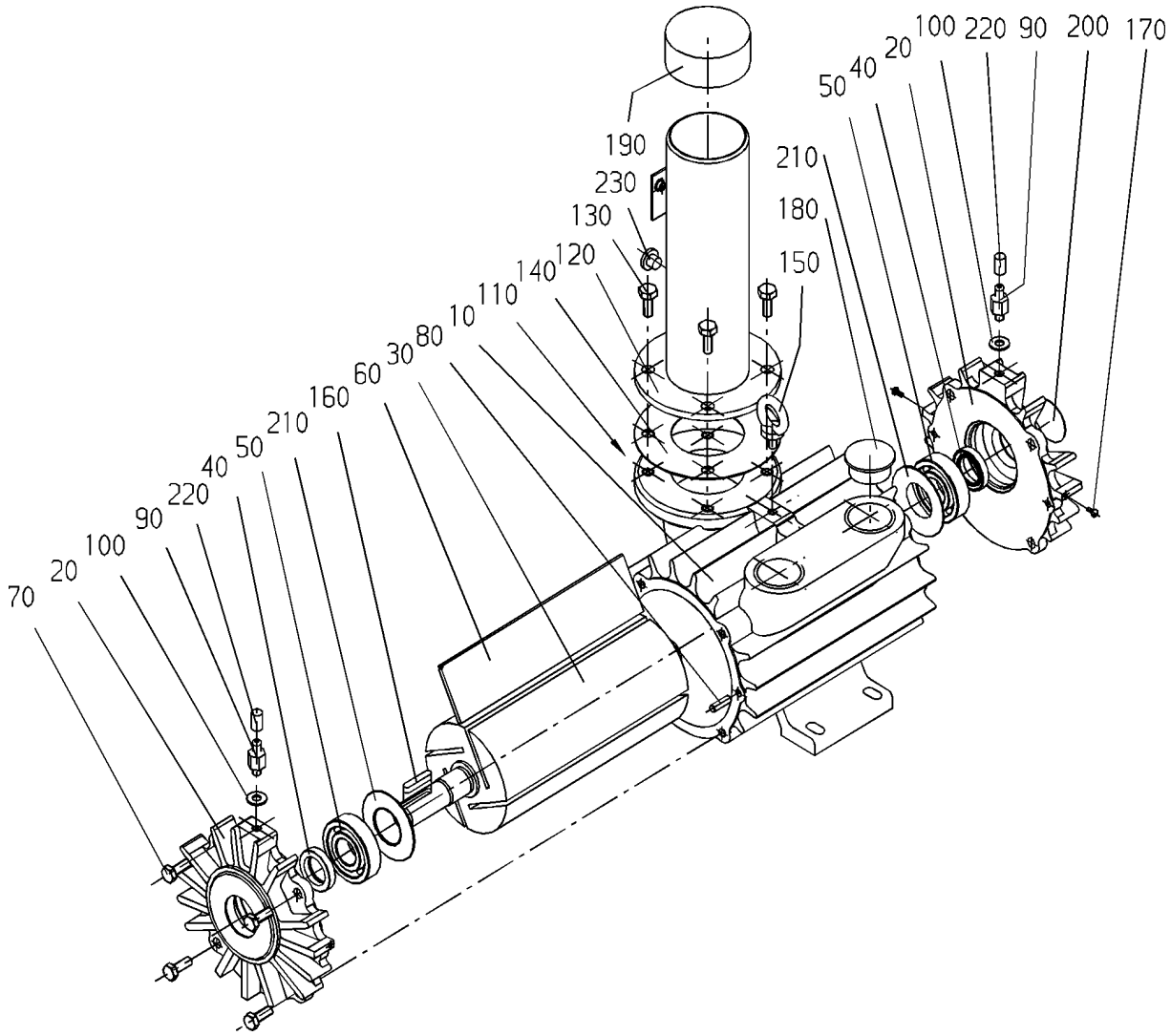
Pos.	Part No.		Description	
1	7047-1001-000		Pump housing	
2	7049-1120-010		End plate	
3	7047-1200-000		Rotor, compl.	
4	0011-6306-000		Deep-groove ball bearing	6306 DIN 625
5	0004-5542-750	**X**	Rotary shaft seal	BAFUD 28X 47X10
6	7047-9926-050	**X**	Set of vanes	(4X 7047-1204-020)
7	0019-6935-300		Hexagon head bolt	M10 X 25, ISO 4017
8	0026-1102-030		Cylindrical pin	8H8X24, DIN 7
9	7045-1935-010		Valve complete	
10	0004-1871-720		Gasket	10 X 22 X2
11	0026-1743-160		Feather key	A 8 X 7 X 40, DIN 6885
12	0024-6190-000		Rating plate	35X70 - RPS 230-400
14	7047-1017-018		Pipe	1 1/2IN
15	0013-1028-250		Lock nut	P4-1 1/2IN, EN 10242
16	0018-0025-250		Elbow	A4-1 1/2IN
17	0026-2132-890		Cap	52 X37
X -Wearing part, replace in regular service.				

Vacuum pump compl. “RPS 800” / “RPS 1200”



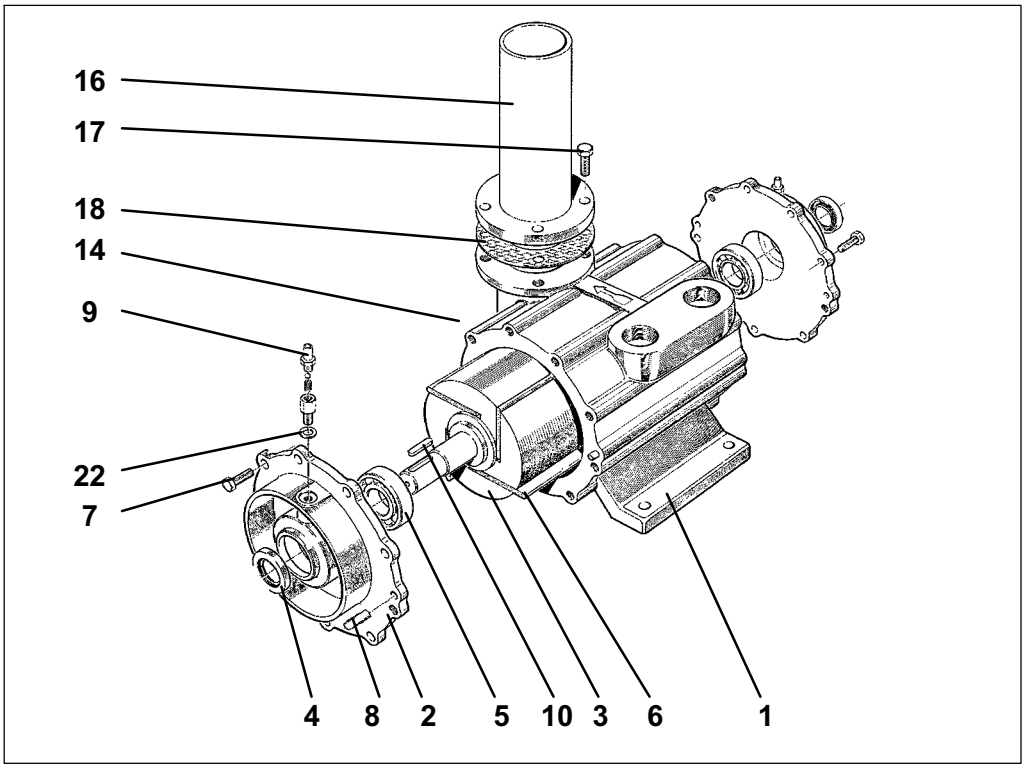
Pos.	Part No.		Description	
1	7049-1001-010		Pump housing	
2	7049-1120-010		End plate	
3	7049-1200-030		Rotor, compl.	
4	0004-5542-750	**X**	Rotary shaft seal	BAFUD 28X 47X10
5	0011-6306-000		Deep-groove ball bearing	6306, DIN 625
6	7049-9926-120	**X**	Set of vanes	RPS 600-1200 (2-piece)
7	0019-6935-300		Hexagon head bolt	M10 X 25, ISO 4017
8	0026-1102-030		Cylindrical pin	8H8X24, DIN 7
9	7045-1935-010		Valve complete	
10	0004-1871-720		Gasket	10 X 22 X 2
11	0024-6191-000		Rating plate	35X70 - RPS 600-1200
14	7049-5574-000		Pipe, welded	2IN
15	0019-5382-050		Eye bolt	M10, DIN 580
16	0013-1028-250		Lock nut	P4-1 1/2IN, EN 10242
17	0018-0025-250		Elbow	A4-1 1/2IN
18	0026-1743-160		Feather key	A 8 X 7 X 40, DIN 6885
19	0019-2493-300		Cheesehead screw	M 5 X 12, ISO 1580
20	0026-2446-890		Cap	64,3X35
21	6966-0665-150		Stamped section	49
X -Wearing part, replace in regular service.				

Vacuum pump compl. “RPS 1500” / “RPS 2100”



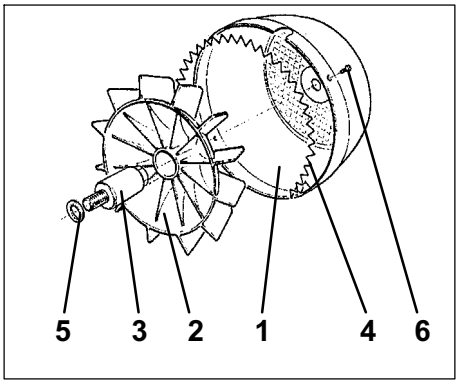
Pos.	Part No.		Description	Description
10	7043-1001-000		Pump housing	RPS1500-2100 / D155X280
20	7043-1120-000		End plate	RPS1500-2100 / D155 E15
30	7043-1200-000		Rotor, compl.	RPS1500-2100 / D28 / D125X280
40	0004-3181-830	**X**	Rotary shaft seal	BAUM 3X7 A30X 47X7
50	0011-6306-000		Deep-groove ball bearing	6306, DIN 625
60	7043-9926-010	**X**	Set of vanes	RPS1500-2100 (1-piece)
70	0019-6935-300		Hexagon head bolt	M10 X 25, ISO 4017
80	0026-1102-030		Cylindrical pin	8H8X24, DIN 7
90	7045-1935-010		Valve complete	
100	0004-1871-720		Gasket	10 X 22 X 2
110	0024-6279-000		Rating plate	35X70 - RPS 1400-2100
120	7050-5557-040		Flange, welded	
130	0019-6968-300		Hexagon head bolt	M12 X 25, ISO 4017
140	0004-5251-700		Gasket	80 X 160 X1
150	0019-5382-050		Eye bolt	M10, DIN 580
160	0026-1743-160		Feather key	A8 X 7 X 40, DIN 6885
170	0019-2493-300		Cheesehead screw	M 5 X 12, ISO 1580
180	0003-3647-800		Plug	A 46
190	0026-2270-890		Cap	92,9X37
200	6966-0665-150		Stamped section	49
210	7043-2590-000		Protective cover	RPS1500-2100, D40H7/D79,6X3,4
220	0026-2253-890		Cap	9,5X23
230	7038-2777-010		Plug	
X -Wearing part, replace in regular service.				

Vacuum pump compl. “RPS 2800”



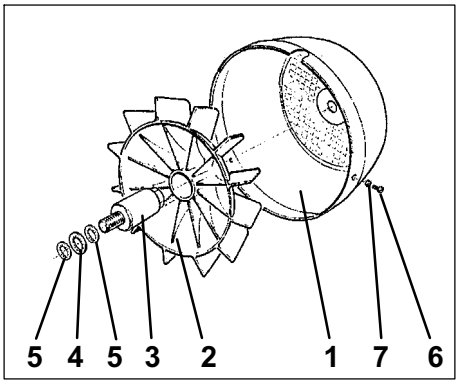
Pos.	Part No.		Description	
1	7050-1001-000		Pump housing	
2	7050-1120-010		End plate	
3	7050-1200-000		Rotor, compl.	
4	0004-5546-830	**X**	Rotary shaft seal	BAU3 35X 56X10/7
5	0011-6307-380		Deep-groove ball bearing	6307-C3, DIN 625
6	7050-9926-030	**X**	Set of vanes	7050-1204-050(4)
7	0019-6935-300		Hexagon head bolt	M10 X 25, ISO 4017
8	0026-1114-030		Cylindrical pin	10H8X28, DIN 7
9	7045-1935-010		Valve complete	
10	0026-1745-160		Feather key	A 8 X 7 X 50, DIN 6885
11	0019-6839-300		Hexagon head bolt	M 6 X 10, ISO 4017
12	0026-1382-300		Washer	6,4, DIN 125
13	0019-5382-050		Eye bolt	M10, DIN 580
14	0024-6192-000		Rating plate	35X70 - RPS 1500-2800
16	7050-5557-040		Flange, welded	
17	0019-6968-300		Hexagon head bolt	M12 X 25, ISO 4017
18	0004-5251-700		Gasket	80 X 160 X 1
19	0003-3647-800		Plug	A 46
21	0026-2270-890		Cap	92,9X37
22	0004-1871-720		Gasket	10 X 22 X 2
X -Wearing part, replace in regular service.				

11.3 Set of accessories(Fan RPS 400-2100)



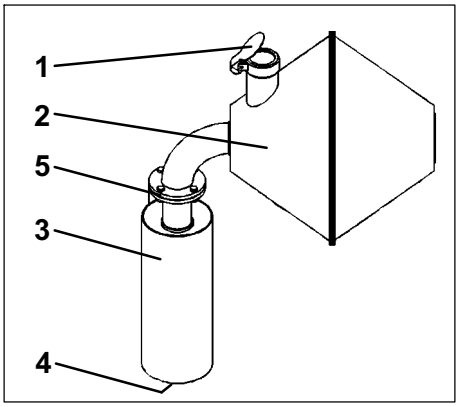
Pos.	Part No.		Description	
	7047-9901-200		Set of accessories	Fan RPS 400-2100
10	7049-1696-000		Ventilator cowl	
20	7049-1309-000		Fan blade, compl.	
30	7049-1404-010		Shaft extension	
40	7049-1111-000		Guard wire	
50	0026-5674-170		Serrated lock washer	J13 DIN 6798
60	0019-2493-300		Cheesehead screw	M5x12 ISO 1580

11.4 Set of accessories (fan RPS 2800)



Pos.	Part No.		Description	
	7050-9901-050		Set of accessories	Fan RPS 2800
10	7050-1696-000		Ventilator cowl	
20	7049-1309-000		Fan blade, compl.	
30	7049-1404-010		Shaft extension	
40	0026-1371-300		Washer	13 DIN 125
50	0026-1328-190		Spring washer	A12 DIN 127
60	0019-2491-300		Cheesehead screw	M5x8 ISO 1580
70	0026-1323-190		Spring washer	B5 DIN 125

11.5 Exhaust gas section

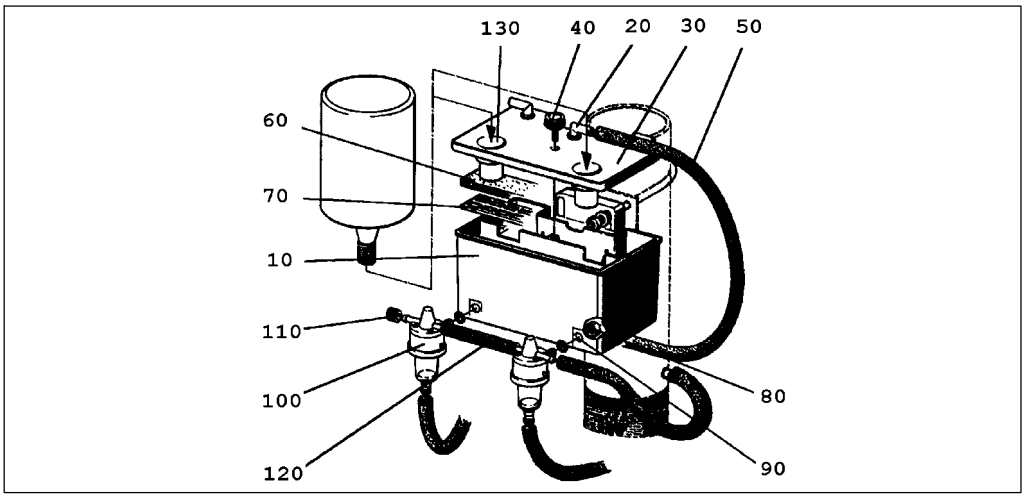


Pos.	Part No.		Description	
			Exhaust gas section	
1	7047-1935-020		Nonreturn valve, compl.	
2	7047-1737-080		Oil trap, compl.	
3	7047-1344-029		Silencer, welded	
4	7047-9901-050		Set of accessories	for sealing
5	7046-2165-000		Set of fasteners	

11.6 Conversion kit(Oiler RPS 400-1200)

Pos.	Part No.		Description	
	7049-3200-080		Conversion kit	
0010	7049-1010-010		Oil reservoir, compl.	
0020	0018-4944-820		Angle connector	
0030	7038-2284-010		Stopper	
0040	0018-4794-750	**X**	Hose	6,5x3,25x350
0050	0018-2757-750	**X**	Hose	6,5x3,25x500
0120	0019-6903-150		Hexagon head bolt	ISO 4017 M 8x20
0150	0026-1345-300		Washer	DIN 125 8,4
X -Wearing part, replace in regular service.				

Oil reservoir, compl. (2 off)

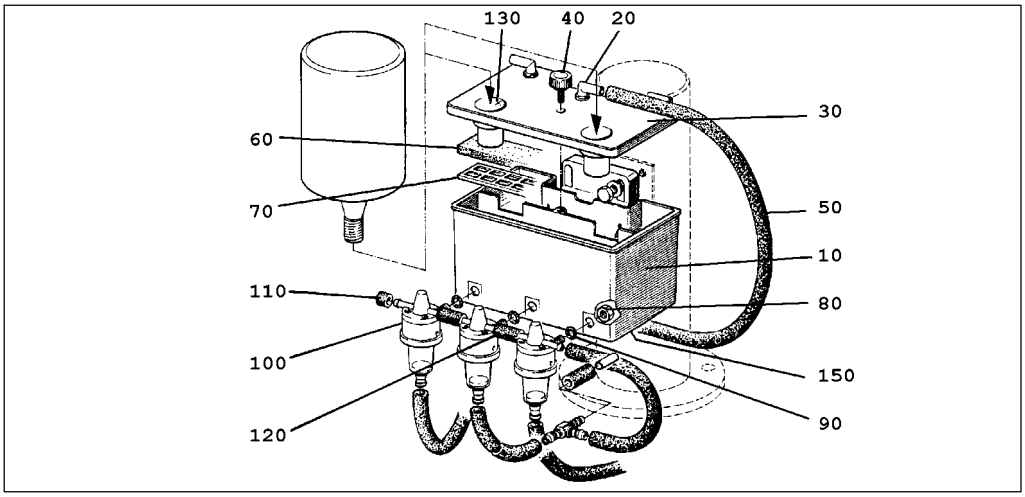


Pos.	Part No.		Description	
	7049-1010-010		Oil reservoir, compl.	2 off
0010	7049-1009-000		Oil reservoir	
0020	7047-2809-010		Inlet angle	
0030	7050-1159-010		Lid	
0040	0019-0145-000		Knurled screw	M 6 x 15
0050	0018-1518-810	**X**	Hose	8x2x400
0060	7050-1799-010	**X**	Foam filter	
0070	7050-6720-000		Strainer insert	
0080	0013-0278-300		Hexagon head nut	ISO 4032 M8
0090	0007-2987-750		Gasket	6 x 1,5
0100	7050-1935-000		Oil regulating valve, compl.	178x42x12
100a	7050-1799-000		Foam filter	Ø22
0110	7038-2347-000		Cap	
0120	0018-6081-750	**X**	Hose	6,5x3,25x95
0130	0003-3861-800		Plug	B 25,7
X -Wearing part, replace in regular service.				

11.7 Set of conversion parts (oiler RPS 1500-2800)

Pos.	Part No.		Description	
	7050-3200-020		Conversion kit	
0010	7050-1010-010		Oil reservoir, compl.	
0020	0018-3149-820		T-piece for hose connection	8
0030	7050-2284-000		Stopper	
0040	0018-4791-750	**X**	Hose	6,5x3,25x300
0050	0018-2757-750	**X**	Hose	6,5x3,25x500
0060	0018-2756-750	**X**	Hose	6,5x3,25x165
0070	0018-2757-750	**X**	Hose	6,5x3,25x500
0090	7051-2045-000		Hose connector	
0100	0019-6903-150		Hexagon head bolt	ISO 4017 M 8 x 20
0110	0026-1345-300		Washer	DIN 125 8,4
X -Wearing part, replace in regular service.				

Oil reservoir, compl. (3 off)



Pos.	Part No.		Description	
	7050-1010-010		Oil reservoir, compl.	3 off
0010	7050-1009-010		Oil reservoir	
0020	7047-2809-010		Inlet angle	
0030	7050-1159-010		Lid	
0040	0019-0145-000		Knurled screw	M 6 x 15
0050	0018-1518-810	**X**	Hose	8x2x400
0060	7050-1799-010	**X**	Foam filter	178x42x12
0070	7050-6720-000		Strainer insert	
0080	0013-0278-300		Hexagon head nut	ISO 4032 M8
0090	0007-2987-750		Gasket	6 x 1,5
0100	7050-1935-000		Oil regulating valve, compl.	
100a	7050-1799-000		Foam filter	Ø22
0110	7038-2347-000		Cap	
0120	0018-1517-750	**X**	Hose	6,5x3,25x30
0130	0003-3861-800		Plug	B 25,7
0150	0018-3751-170		Hose clip	A8
X -Wearing part, replace in regular service.				

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