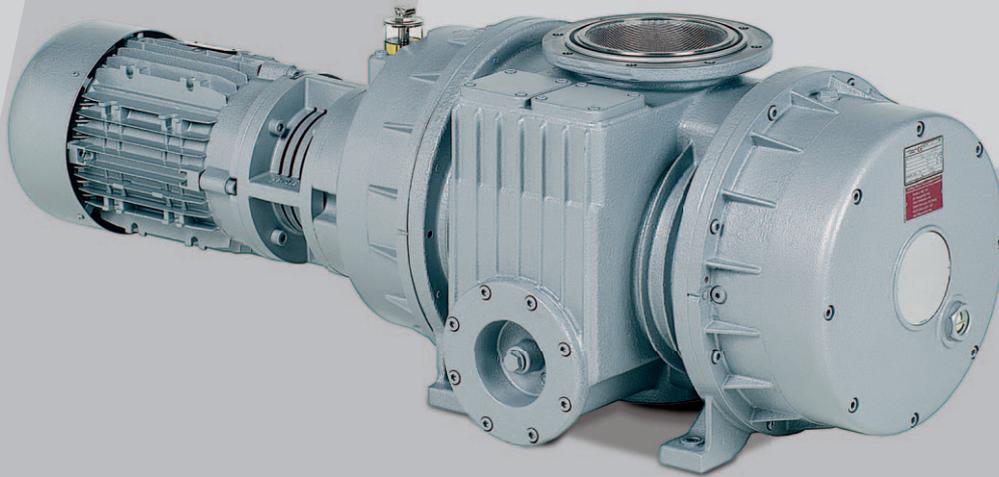


Original Operating Instructions R-VWP

R-VWP 500 | 1000 | 1500 | 2500



**Elmo
Rietschle**
A Gardner Denver Product



**R-Serie
R-Series**
Wälzkolben
Rotary Lobe



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Foreword

1 Foreword

1.1 Principles

These operating instructions:

- are a part of the following contact free running rotary lobe vacuum pumps, models R-VWP 500, R-VWP 1000, R-VWP 1500 and R-VWP 2500.
- describe how to use them safely and properly in all life phases.
- must be available where the equipment is used.

1.2 Target group

The target group for these instructions is technically trained specialists.

1.3 Supplier documentation and accompanying documents

Document	Contents	No.
Supplier documentation	Operating Instructions	BA 200-EN
	Declaration of Conformity	C 0050-EN
	Declaration of harmlessness	7.7025.003.17
Spare parts' list	Spare parts document	E 199 / E 200 E 201
Data sheet	Technical data and graphs	D 200 / D 201
Info sheet	Storage guidelines for machines	I 150
Manufacturer's declaration	EU Directive 2002/95/EG (RoHS)	—

1.4 Abbreviations

Fig.	Figure
R-VWP	vacuum pump
m ³ /h	pumping capacity

1.5 Directives, standards, laws

See Conformity Declaration

1.6 Symbols and meaning

Symbol	Explanation
▷	Condition, pre-requisite
####	Instructions, action
a), b),...	Instructions in several steps
⇒	Results
 [-> 14]	Cross reference with page number
	Information, note
	Safety symbol Warns of potential risk of injury Obey all the safety instructions with this symbol in order to avoid injury and death.

1.7 Technical terms and meaning

Term	Explanation
Machine	Pump and motor combination ready to be connected
Motor	Pump drive motor
Vacuum pump	Machine to create a vacuum
Rotary lobe	Machine's design or active principle
Pumping capacity	Vacuum pump volume flow related to the condition in the suction connection
Compression ratio	The compression ratio specifies the proportion between the intake pressure and the pre-vacuum.
Noise emission	The noise emitted at a specific loading given as a figure, sound pressure level dB(A) as per EN ISO 3744.

1.8 Copyright

Passing on or copying this document, using and providing information on its contents are prohibited unless expressly permitted. Contraventions will lead to claims for damages.

2 Safety

The manufacturer is not responsible for damage if you do not follow all of this documentation.

2.1 Warning instruction markings

Warning	Danger level	Consequences if not obeyed
 DANGER	immediately imminent danger	Death, severe bodily injury
 WARNING	possible imminent danger	Death, severe bodily injury
 CAUTION	possible hazardous situation	Slight bodily injury
 NOTICE	possible hazardous situation	Material damage

2.2 General

These operating instructions contain basic instructions for installation, commissioning, maintenance and inspection work which must be obeyed to ensure the safe operation of the machine and prevent physical and material damage.

The safety instructions in all sections must be taken into consideration.

The operating instructions must be read by the responsible technical personnel/ operator before installing and commissioning and must be fully understood. The contents of the operating instructions must always be available on site for the technical personnel/ operator. Instructions fixed directly onto the machine must be obeyed and must always remain legible. This applies for example to:

- Symbols for connections
- Data and motor data plate
- Instruction and warning plates

The operator is responsible for observing local regulations.

2.3 Designated use

The machine must only be operated in such areas as are described in the operating instructions:

- only operate the machine in a technically perfect condition
- do not operate the machine when it is only partially assembled
- the machine must only be operated at an ambient temperature and suction temperature of between 5 and 40°C. Please contact us for temperatures outside this range.
- Rotary lobe pumps are used, normally, in combination with backing pumps.
- the machine may convey, compress or extract the following media:
 - all non-explosive, non-inflammable, non-aggressive and non-poisonous dry gases and gas air mixtures
 - also to feed in extremely damp gases. The water vapour compatibility is very high.

2.4 Unacceptable operating modes

- extracting, conveying and compressing explosive, inflammable, aggressive or poisonous media, e.g. dust as per ATEX zone 20-22, solvents as well as gaseous oxygen and other oxidants, water vapour, liquids or solid materials
- using the machine in non-commercial plants if the necessary precautions and protective measures have not been taken in the plant
- installing in environments that are at risk of explosions
- using the machine in areas with ionising radiation
- modifications to the machine and accessories

2.5 Personal qualifications and training

- Ensure that people entrusted with working on the machine have read and understood these operating instructions before starting work, particularly the safety instructions for installation, commissioning, maintenance and inspection work.
- Manage the responsibilities, competence and monitoring of staff
- all work must only be carried out by technical specialists:
 - Installation, commissioning, maintenance and inspection work
 - Working with electricity
- personnel being trained to work on the machine must be supervised by technical specialists only

2.6 Safety-conscious work

The following safety regulations apply in addition to the safety instructions and intended use listed in these instructions:

- Accident prevention regulations, safety and operating regulations
- the standards and laws in force

2.7 Safety notes for the operator

- hot parts of the machine must not be accessible during operation or must be fitted with a guard
- People must not be endangered by the free extraction or discharge of pumped media
- Risks arising from electrical energy must be eliminated.
- The machine must not be in touch with inflammable substances.
Danger of fire by hot surfaces, discharge of pumped media or cooling air

2.8 Safety instructions for installing, commissioning and maintenance

- The operator will ensure that any installation, commissioning and maintenance work is carried out by authorised, qualified specialists who have gained sufficient information by an in-depth study of the operating instructions.
- Only work on the machine when it is idle and cannot be switched on again
- Ensure that you follow the procedure for decommissioning the machine described in the operating instructions.
- Fit or start up safety and protective devices again immediately after finishing work.
- Conversion work or modifications to the machine are only permissible with the manufacturer's consent.
- Only use original parts or parts approved by the manufacturer. The use of other parts may invalidate liability for any consequences arising.
- Keep unauthorised people away from the machine

2.9 Guarantee conditions

The manufacturer's guarantee or warranty will no longer apply in the following cases:

- Improper use
- Not complying with these instructions
- Operation by insufficiently qualified staff
- Using spare parts that have not been approved by **Gardner Denver Schopfheim GmbH**
- Unauthorised modifications to the machine or the accessories supplied by **Gardner Denver Schopfheim GmbH**

3 Transport, storage and disposal

3.1 Transportation

3.1.1 Unpack and check the delivery condition

- a) Unpack the machine on receipt and check for transport damage.
- b) Notify the manufacturer of transport damage immediately
- c) Dispose of the packaging in accordance with the local regulations in force.

3.1.2 Lifting and transporting



WARNING

Death or limbs crushed as a result of the items being transported falling or tipping over.

- ▷ When transporting with the lifting device remember:
 - a) Select the lifting device suitable for the total weight to be transported.
 - b) Ensure that the machine cannot tip and fall.
 - c) Do not stop under a suspended load.
 - d) Put the goods to be conveyed on a horizontal base.

Lifting device/ Transporting with a crane



WARNING

Bodily injury resulting from improper operation

- a) Loads crosswise to the ring level are not permitted.
- b) Avoid impact stress.

- a) Screw two eyebolts into the threaded holes (Fig. 1/1):
 - M10 → VWP500
 - M12 → VWP1000/1500
 - M20 → VWP2500
- b) Tighten the eyebolts (Fig. 1/2) firmly.
- c) The machine must be suspended on the eyebolts using the lifting device for lifting and transporting.

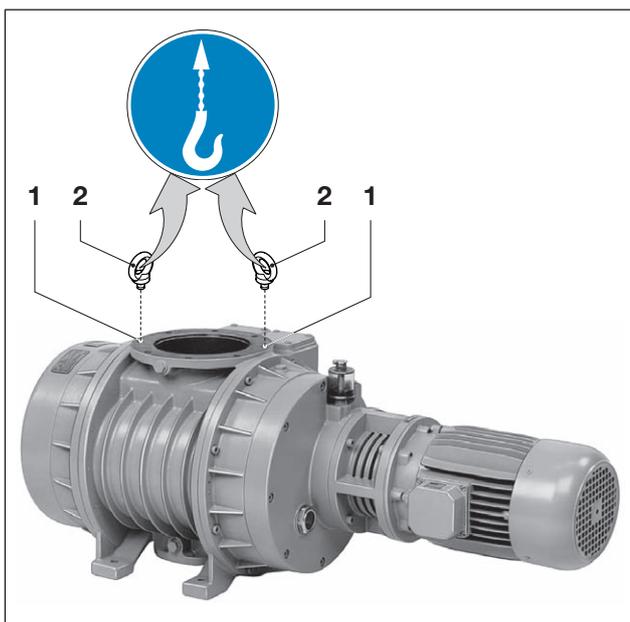


Fig. 1 Lifting and transporting

- 1 Threaded hole
- 2 Eyebolt

3.2 Storage

NOTICE

Material damage caused by improper storage.

- ▷ Ensure that the storage area meets the following conditions:
 - a) dust free
 - b) vibration free

3.2.1 Ambient conditions for storage

Ambient conditions	Value
Relative humidity	0% to 80 %
Lagertemperatur	-10°C to +60°C



The machine must be stored in a dry environment with normal air humidity. It should not be stored for more than 6 months.

📄 see Info “Machine storage guidelines”, Page 4

3.3 Disposal

⚠️ WARNING

Danger from inflammable, corrosive or poisonous substances.

Machines that come into contact with hazardous substances must be decontaminated before disposal.

- ▷ When disposing ensure the following:
 - a) Collect oils and grease separately and dispose of in accordance with the local regulations in force.
 - b) Do not mix solvents, limescale removers and paint residues
 - c) Remove components and dispose of them in accordance with the local regulations in force.
 - d) Dispose of the machine in accordance with the national and local regulations in force.
 - e) Parts subject to wear and tear (marked as such in the spare parts list) are special waste and must be disposed of in accordance with the national and local waste laws.

4 Set up and operation

4.1 Setup

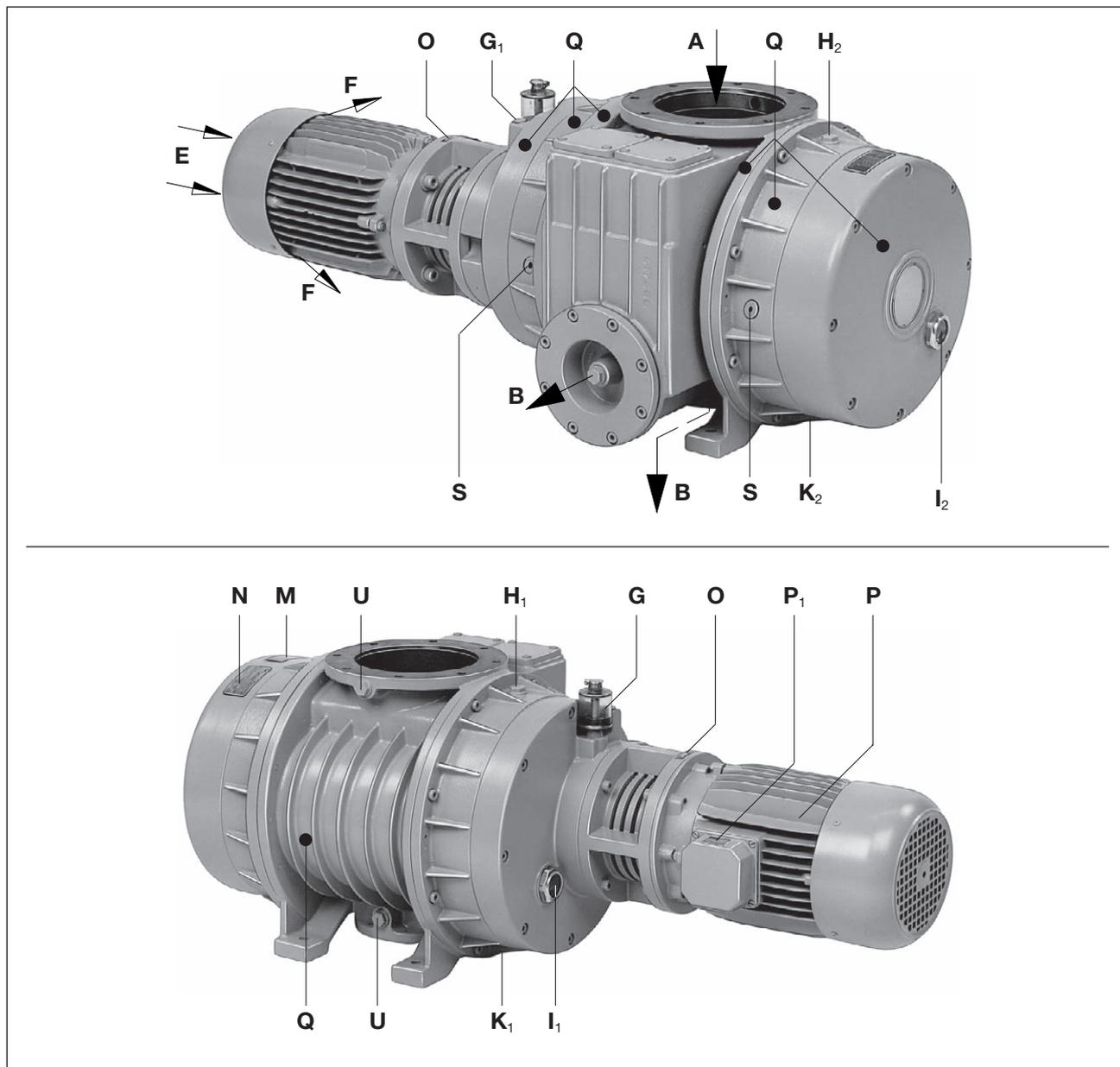


Fig. 2 Rotary lobe vacuum pump R-VWP 500 / R-VWP 1000 / R-VWP 1500

- | | | | |
|-------------------------------------|------------------------|----------------------|--------------------------|
| A | High-vacuum connection | M | Oil recommendation plate |
| B | Pre-Vacuum connection | N | Data plate |
| E | Cooling air inlet | O | Rotation direction plate |
| F | Cooling air outlet | P | Drive motor |
| G | Sealing oil pot | P₁ | Motor data plate |
| G₁ | Ventilation screw | Q | hot surfaces > 70S °C |
| H₁, H₂ | Oil filling point | S | Sealing gas connection |
| I₁, I₂ | Oil sight glass | U | Gauge connection |
| K₁, K₂ | Oil discharge point | | |

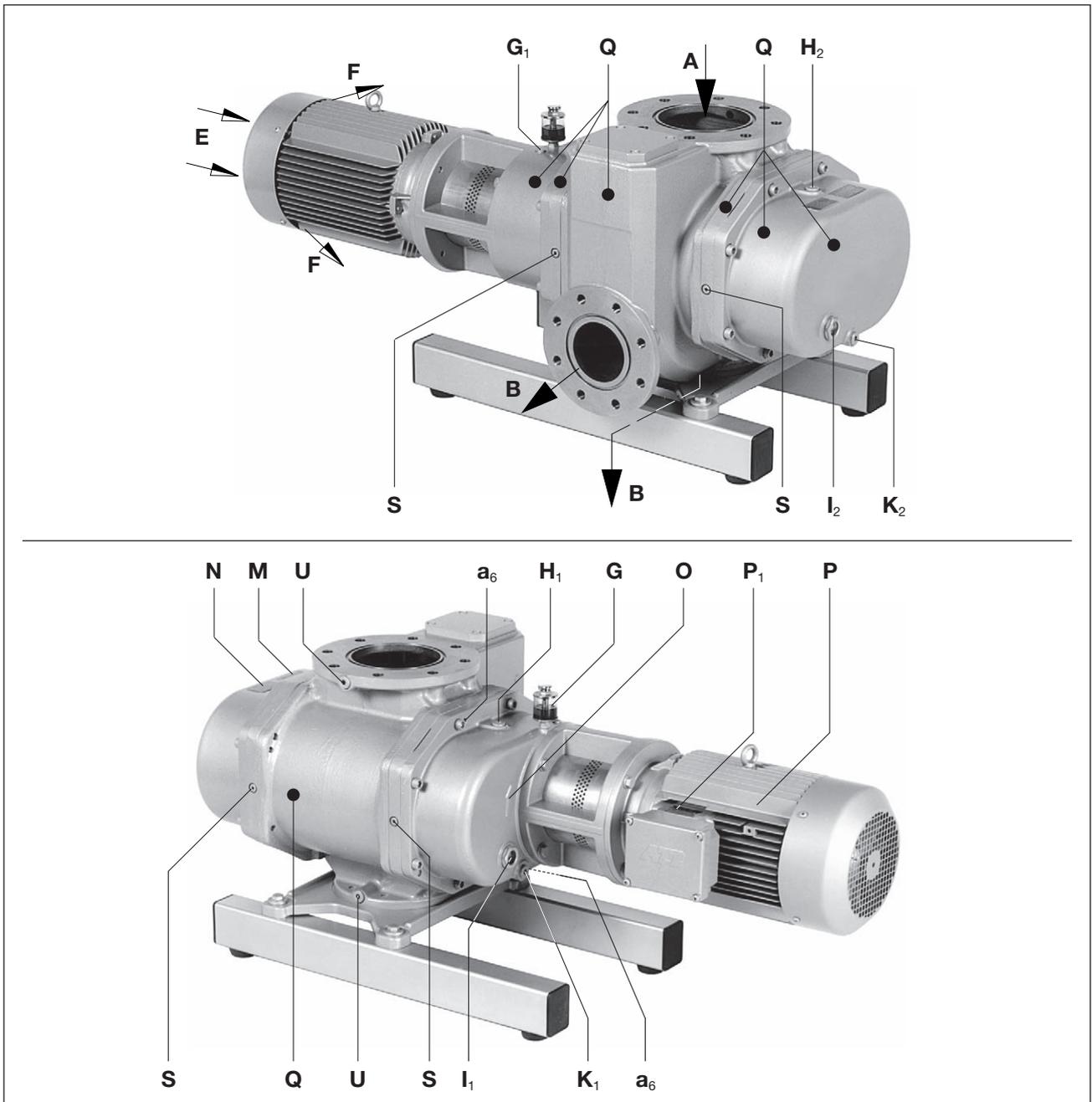


Fig. 3 Rotary lobe vacuum pump R-VWP 2500

- | | | | |
|-------------------------------------|--------------------------|----------------------|--------------------------|
| A | Vacuum connection | N | Data plate |
| B | Exhaust air outlet | O | Rotation direction plate |
| E | Cooling air inlet | P | Drive motor |
| F | Cooling air outlet | P₁ | Motor data plate |
| G | Sealing oil pot | Q | hot surfaces > 70°C |
| G₁ | Ventilation screw | S | Sealing gas connection |
| H₁, H₂ | Oil filling point | U | Gauge connection |
| I₁, I₂ | Oil sight glass | a₆ | Threaded hole |
| K₁, K₂ | Oil discharge point | X | Foot (optional extras) |
| M | Oil recommendation plate | | |

Set up and operation

4.1.1 Data plate

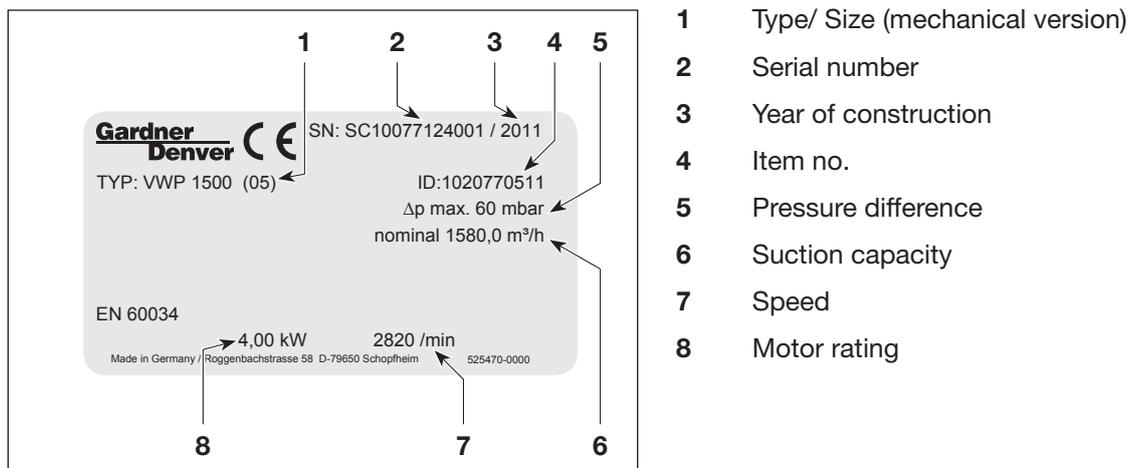


Fig. 4 Data plate

4.2 Description

Roots pumps are two shaft, rotary piston pumps, where two symmetrical rotary pistons are rotating in opposite directions in a housing and are synchronised by a pair of toothed gears.

The pumping chamber of Roots pumps is oil free. The synchronised drive gears and the bearings for the rotors are oil lubricated. The drive gears and the bearings are fitted into the two end chambers which also contain the oil tanks.

Both the end chambers are separated from the pumping chamber using labyrinth seals. Both oil tanks are designed so that all rotational speeds, bearings and gears are supplied with the correct amount of oil.

An integral unloading valve (Fig. 5/C) gives the automatic facility to start the Roots pump at the same time as the backing pump. Consequently when starting, an overload of the drive motor can be avoided.

The R-VWP has a protection mesh on the inlet.

High-vacuum connection (Fig. 2/A, 3/A 5/A) and pre-vacuum connection (Fig. 2/B, 3/B, 5/B) have flanges according to DIN 28404 (R-VWP 500/ 1000/ 1500) or DIN 2501 (R-VWP 2500).

All the pumps are driven by a direct flanged three phase, standard TEFV motor via a pin and bush coupling.

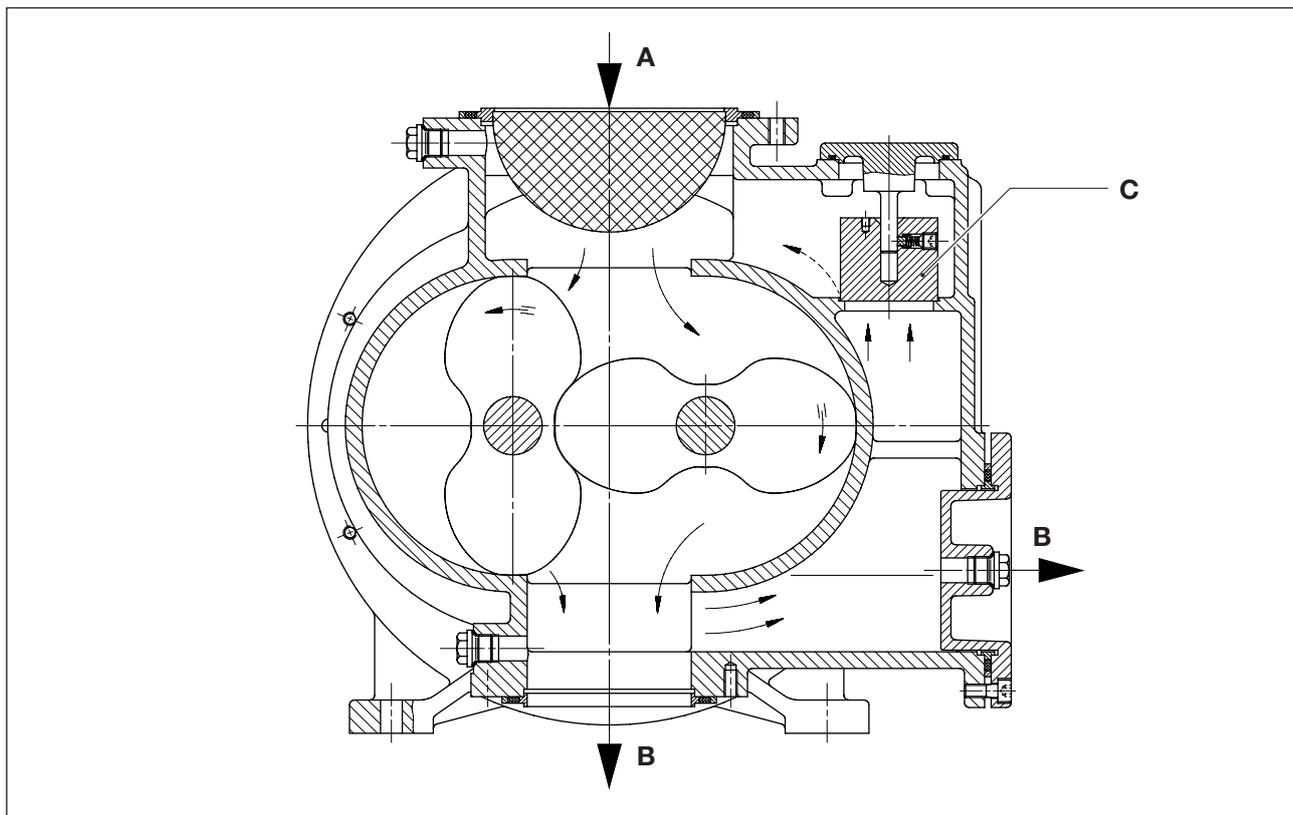


Fig. 5 Rotary lobe vacuum pump R-VWP

A High-vacuum connection

C Unloading valve

B Pre-Vacuum connection

4.3 Areas of application

The contact-less operating Roots vacuum pumps R-VWP are primarily used for producing coarse and fine vacuum and for handling gasses and vapours.

They can tolerate water vapour and most corrosive vapours. Contamination that could be drawn in such as dust and liquid can not build up in the conveyor chamber even after shutdown because the direction of flow is from the top to the bottom of the units.

Roots boosters are normally used in combination with backing pumps.

The vacuum capacities at atmosphere are 485, 1072, 1580 und 2293 m³/hr operating on 50 cycles. The pumping curves which show max. compression ratio against pre-vacuum, can be found in data sheets D200 and D201.



If the unit is switched on more frequently (at regular intervals of about 10 times per hour or at higher ambient temperatures and intake temperatures, the excess temperature limit of the motor winding and the bearings may be exceeded. Please contact the manufacturer should the unit be used under such conditions.



If it is installed in the open air the unit must be protected from environmental influences, (e.g. by a protective roof).

5 Installation

5.1 Preparing for installation

Check the following points:

- Machine freely accessible from all sides
- Do not close ventilation grids and holes
- Sufficient room for installing and removing pipes and for maintenance work, particularly for installing and dismantling the machine
- No external vibration effects
- Do not suck any hot exhaust air from other machines into the cooling system.



The oil filling ports (Fig. 2, 3/H₁, H₂), oil sight glasses (Fig. 2, 3/I₁, I₂), oil drain points (Fig. 2, 3/K₁, K₂) and sealing oil pot (Fig. 2, 3/G) should all be easily accessible. The cooling air entry (Fig. 2, 3/E) and the cooling air exit (Fig. 2, 3/F) must have a minimum distance of 20 cm from any obstruction. The discharged cooling air must not be re-circulated

5.2 Installation

NOTICE

The machine may only be operated when it is set up horizontally.

Material damage resulting from the machine tipping over and falling.

When installed at more than 1000 m above sea level a reduction in power is noticeable. In this case we would ask you to contact us.

**Contamination in the intake air
To protect the machine the operator should install appropriate filters on the suction side.**

Ensure that the foundation complies with the following conditions:

- Level and straight
- The bearing surface must be designed to be able to take the weight of the machine.



The Roots pumps should be mounted in a horizontal position. Four holes are provided in the foot for securing. For free installation without fixation, we recommend to ensure stability a base frame with anti-vibration mounts (optional extras).
If the pumps are installed on a base plate we would recommend fitting anti-vibration mounts.

NOTICE

When holding down bolts are tightened care should be taken that no stress is transferred to the pump base. Similarly when connecting the pipework care should be taken and if necessary pipe bellows should be used.

5.2.1 Connection positions

The VWP can be operated in 4 different connection positions.
Standard version is position 01.

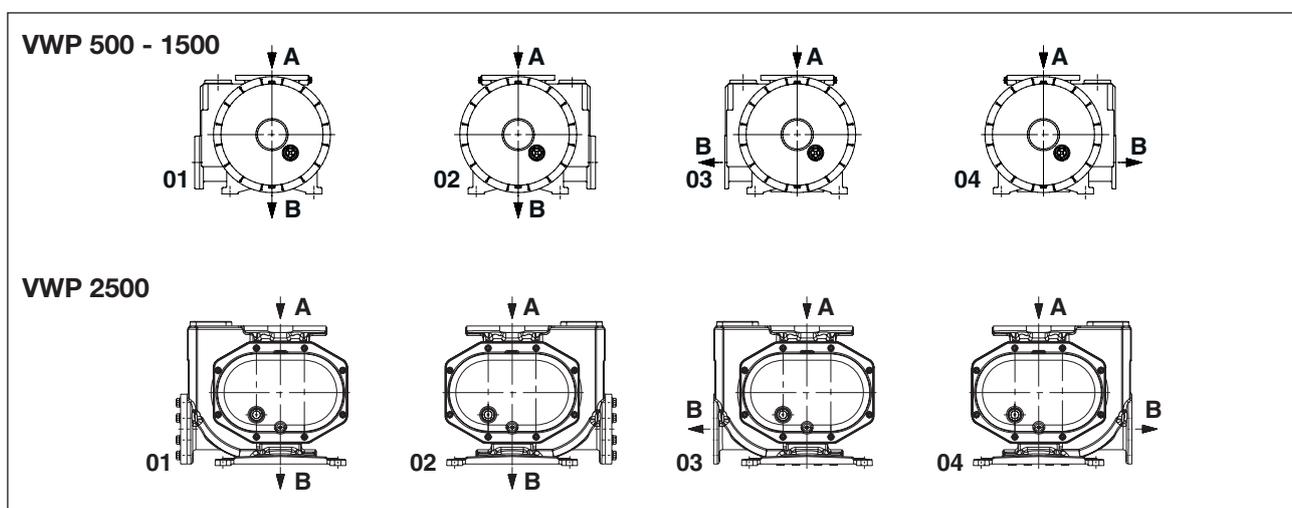


Fig. 6 Connection positions

Installation

5.3 Connecting pipes

- a) Remove transportation cover of the pre-vacuum and high-vacuum connection.
- b) High-vacuum connection at (Fig. 2/A... 3/A).

NOTICE

The pumping capacity of the vacuum pump is reduced if the suction pipe is too narrow and/or too long.

If the suction pipe is longer than 5 m, then a larger diameter than that of the pump flange should be used.

- c) Pre-vacuum connection at (Fig. 2/B... 3/B).

NOTICE

The pre-vacuum connection must not be obstructed or partly obscured.

5.4 Sealing gas connection

In order to prevent aggressive media from penetrating into the gear chamber, sealing gas can be superimposed over the labyrinth sealing system (see sealing gas connection (Fig. 2, 3/S)).
For further information please contact our company.

5.5 Gauge connection

Gauge connection at (Fig. 2, 3/U) for connecting of measuring installations.

5.6 Filling with lubricating oil

- a) The lubricating oil (recommended brands see under "Maintenance") for the toothed wheels and bearings can be put into the booth oil filler ports (Fig. 2, 3/H₁, H₂), until the oil level shows at the middle of the oil sight glasses (Fig. 2, 3/I₁, I₂). After filling make sure the oil filler port is closed.
- b) The shaft sealing oil must be filled in the sealing oil pot (Fig. 2, 3/G). The oil level must be visible.

5.7 Connecting the motor

**DANGER****Danger of death if the electrical installation has not been done professionally.**

The electrical installation must only be done by a qualified electrician observing EN 60204. The operating company has to provide the main switch.

- a) The motor's electrical data is given on the data plate (Fig. 2, 3/N) or on the motor data plate (Fig. 2, 3/P₁). The motors comply with DIN EN 60034 and are in protection class IP 55 and insulation class F. The appropriate connection diagram is located in the motor's terminal box (not for the plug connection version). The motor data must be compared with the data of the existing mains network (current type, voltage, network frequency, permitted current value).
- b) Connect the motor via the motor protection switch (for safety reasons, a motor protection switch is required and the connecting cable must be installed via a cable fitting to provide strain relief).
We recommend using motor protection switches with delayed switch off, depending on possible excess current. Temporary excess current may occur when the machine is started cold.
- c) The electrical control should be designed to start the pre-pump before the Roots pump or simultaneously.

NOTICE**Power supply**

The conditions at the installation location must match the information on the motor data plate.

Without derating the following is permissible:

- $\pm 5\%$ Voltage deviation
- $\pm 2\%$ Frequency deviation

6 Commissioning and decommissioning

6.1 Commissioning



WARNING

Improper use

May lead to severe or fatal injuries. Therefore be sure to obey the safety instructions.



CAUTION

Hot surfaces

When the machine is at operating temperature the surface temperatures on the components (Fig. 2, 3/Q) may go above 70°C. You must avoid touching the hot surfaces (marked with warning plates).



CAUTION

Noise emission

The highest noise pressure levels measured as per EN ISO 3744 are given in Section 9. When spending a long time in the vicinity of the running machine use ear protectors to avoid permanent damage to your hearing.

NOTICE

Wait until the machine stops.

The machine must only be switched on again after it stops.

6.1.1 Checking the rotation direction

- ▷ The intended direction of rotation of the drive shaft is shown by the rotary direction arrow (Fig. 2, 3/O).
- a) Start the motor briefly (max. two seconds) to check the direction of rotation. When looking at the motor fan, it must rotate clockwise.



NOTICE

Incorrect direction of rotation

Operating in the wrong direction of rotation leads to damage to the machine.

Use a phase sequence indicator to check the direction of rotation (**anti-clockwise rotating field**).

6.2 Decommissioning/ storing

Stop the machine

- a) Switch the machine off.
- b) If available close the cut off device in the suction and pressure pipe.
- c) Disconnect the machine from the electricity source.
- d) Depressurise the machine:
Open the pipes slowly.
⇒ The pressure reduces slowly.
- e) Remove the pipes and hoses.
- f) Seal the connections for suction and discharge nozzles with adhesive foil.

📄 see also Section 3.2.1, Page 11

6.3 Re-commissioning

- a) Check the condition of the machine (cleanliness, cabling etc.).
- 📄 For installation see Section 5 Page 16
- 📄 For commissioning see Section 6.1 Page 20

7 Maintenance and repair



DANGER

Danger of death from touching live parts.

Before maintenance work disconnect the machine by pressing the main switch or unplugging it and ensure that it cannot be turned on again.



WARNING

Hot surfaces and equipment

During maintenance work there is the danger of getting burnt on hot components (Fig. 2, 3/Q) and by the machine lubricating oil. Wait for the machine to cool down.

7.1 Ensuring operational safety

Regular maintenance work must be carried out in order to ensure operational safety.

Maintenance intervals also depend on the operational demands on the machine.

With any work observe the safety instructions described in Section 2.8 “Safety notes for installation, commissioning and maintenance”.

The whole unit should always be kept in a clean condition.

7.2 Maintenance work

Interval	Maintenance to be carried out	Section
monthly	Check the pipes and screws for leaks and to ensure they are seated properly and if necessary seal again or tighten up.	—
monthly	Check the terminal box and cable inlet holes for leaks and if necessary re-seal.	—
monthly	Clean the ventilation slots and the cooling ribs on the machine.	—
at least once a year	Check for coupling wear	7.2.1
depending on how dirty the discharged medium is	Clean the protection mesh	7.2.2
weekly / daily	Check the oil level and the sealing oil	7.2.3
5.000 h	Changing the oil	
Sealing oil degrades rapidly	Changing of the shaft sealing rings and the shaft wearing sleeve	7.2.4

7.2.1 Coupling

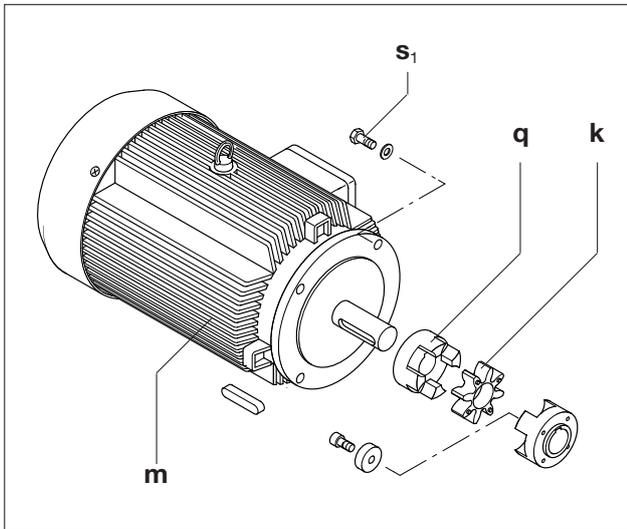


Fig. 7 Coupling VWP 2500

VWP 2500

The coupling sprocket (Fig. 7/k) is subject to wear and must be checked regularly (at least once a year).

CAUTION

Defective coupling sprocket

Defective sprockets may lead to the rotor shaft breaking.

To check the coupling switch the motor (Fig. 7/m) off and ensure that it cannot be switched on again. Remove the screws (Fig. 7/s₁). Remove the motor axially with the half of the coupling on the motor side (Fig. 7/q) and suspend with the lifting device. If the sprocket (Fig. 7/k) is damaged or worn then exchange the rim .

NOTICE

Frequent starting up and high ambient temperature

The service life of the sprocket (Fig. 7/k) is reduced.

Re-assemble in reverse order.

VWP 500 - 1500

The coupling rubbers (Fig. 8/k) are subject to wear and und must be checked regularly (at least once a year). You can tell when the coupling rubbers are worn by a knocking noise when the pump starts up.



CAUTION

Defective coupling rubbers

Defective coupling rubbers may lead to the rotor shaft breaking.

To check the coupling switch the motor (Fig. 8/m) off and ensure that it cannot be switched on again. After unscrewing the allen screws (Fig. 8/s₁) pull off the motor (Fig. 8/m) together with the motor side coupling half (Fig. 8/q) and suspend with the lifting device. After unscrewing the allen screws (Fig. 8/s₂) remove the motor flange (Fig. 8/n). If the coupling rubbers (Fig. 8/k) are damaged remove the circlips (Fig. 8/l) from the coupling bolt (Fig. 8/r) and exchange the coupling rubbers (Fig. 8/k). Leave the spacer (Fig. 8/p) in place.

Checking and changing the coupling bolts (Fig. 8/r): Unscrew countersunk screw (Fig. 8/s₃) and remove with disc (s₄). Pull off the driven coupling (Fig. 8/q₁) with a suitable puller. Remove the nut (Fig. 8/w) with washer (Fig. 8/u) and exchange the coupling bolts.

ACHTUNG

Frequent start up and high ambient temperature

The service life of the coupling rubber (Fig. 8/k) is reduced by this.

Re-assemble in reverse order.

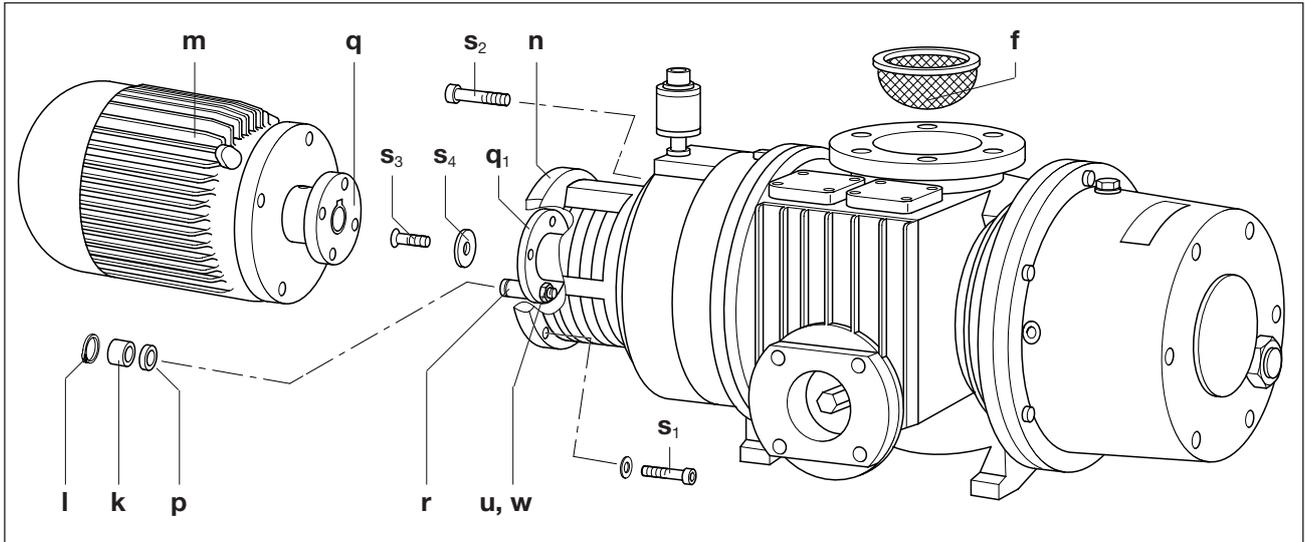


Fig. 8 Coupling VWP 500 - 1500

7.2.2 Air filtering

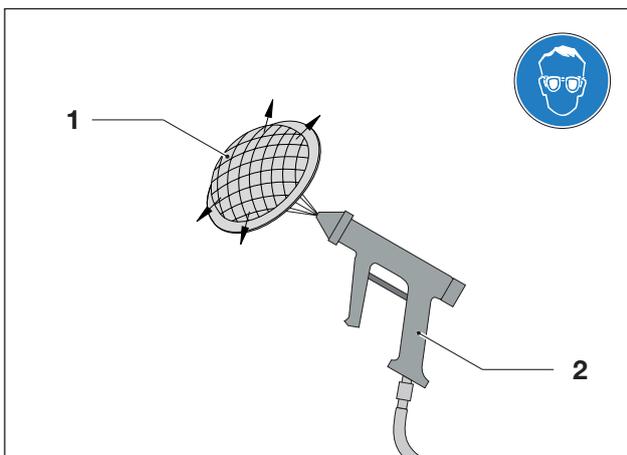


Fig. 9 Blowing out the protection mesh

- 1 Protection mesh
- 2 Compressed air

NOTICE

Insufficient maintenance on the protection mesh

The power of the machine lessens and damage may occur to the machine.

Protection mesh

Optional extras at VWP 2500

The protection mesh (Fig. 9/f) installed on the inlet side must be cleaned by rinsing out or purging or replaced more or less often depending on how dirty the aspirated medium is.

For this the suction pipe to the Roots pump must be removed.

WARNING

Danger of injury when dealing with compressed air.

When blowing through with compressed air, solid particles may be carried along or powder dust swirling around may cause injury to the eyes.

Therefore, when cleaning with compressed air always wear goggles and a dust mask.

7.2.3 Lubricating

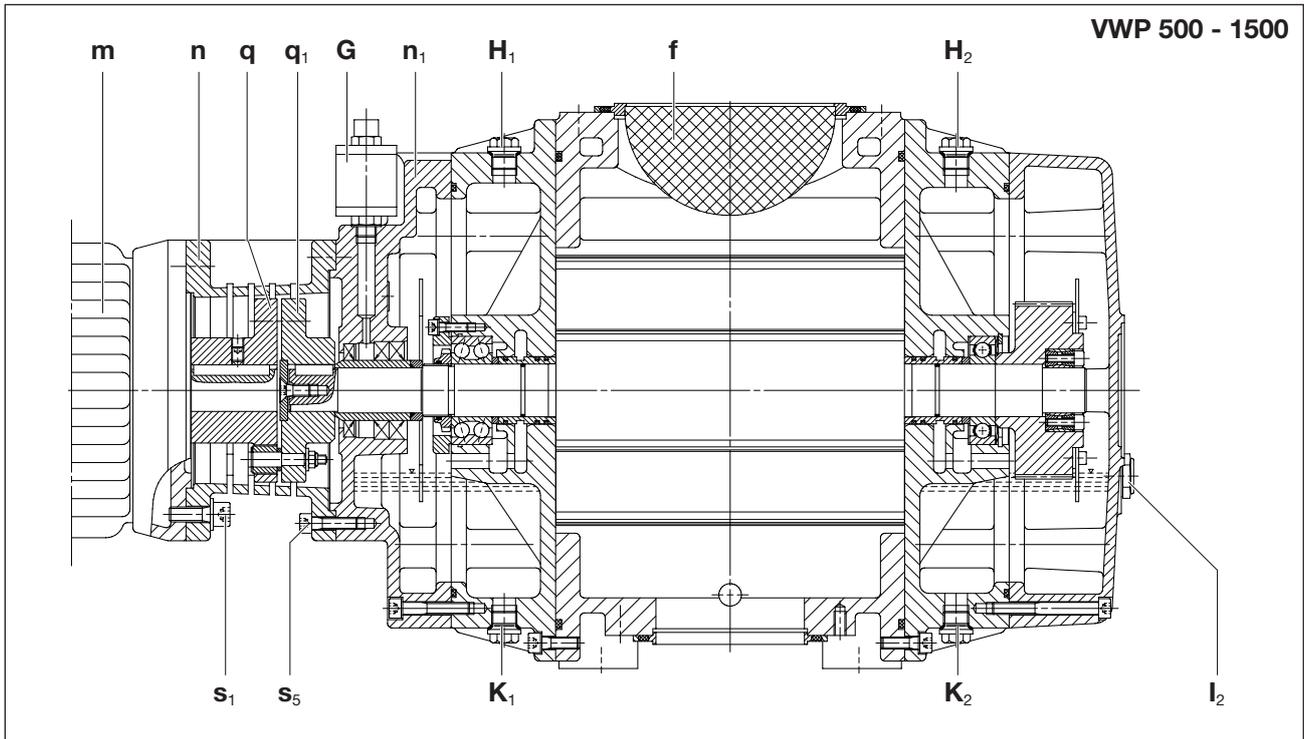


Fig. 10 Lubricating VWP 500 - 1500

NOTICE

Always change the oil when the machine is at operating temperature and in an atmospherically ventilated area. If it is not completely emptied the amount that can be refilled is reduced.

The waste oil must be disposed of in compliance with the local environmental protection regulations. If you are going to use another oil type, empty the oil removing device housing and oil cooler completely.

Sealing oil

When the units are in continuous use the oil level in the oil pot (Fig. 2, 3/G) should be checked daily and the oil in the sight glasses (Fig. 2, 3/l₁, l₂) should be checked weekly. The oil pot may be topped up when the units are in operation. The oil level in the two end cases however can only be topped up when the units are switched off and vented to atmospheric pressure.

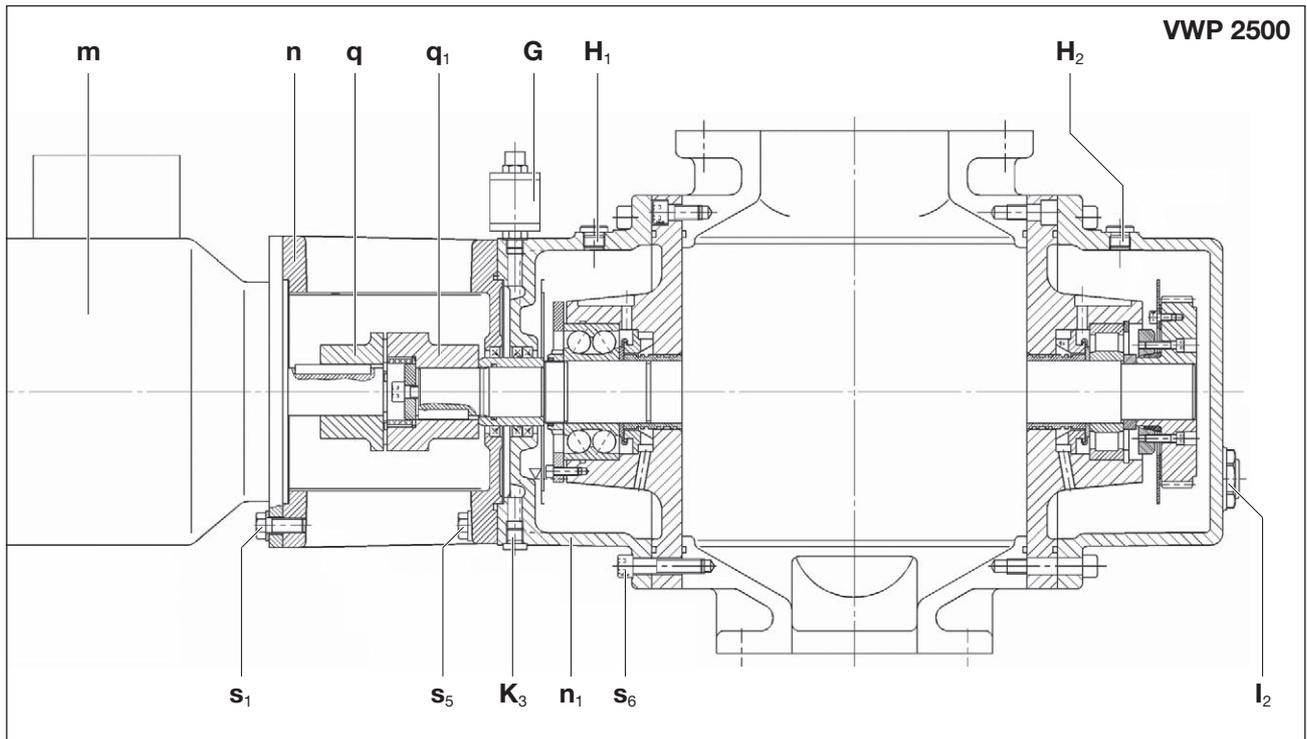


Fig. 11 Lubricating VWP 2500

Oil change

The oil in these two chambers should be changed after 5000 operating hours under normal ambient conditions (see oil drain screws (Fig. 2, 3/K₁, K₂)). The oil in the oil pot does not require complete changing only topping up. If however this consumption is excessive it will be necessary to change the shaft sealing rings and the shaft wearing sleeve. The viscosity must correspond to ISO-VG 100 according to DIN 51519.

VWP 500 - 1500

Elmo Rietschle oil types: MULTI-LUBE 100 (mineral oil) see also oil recommendation plate (Fig. 2/M).

VWP 2500

Elmo Rietschle oil types: SUPER-LUBE 100 (synthetic oil) see also oil recommendation plate (Fig. 3/M).

7.2.4 Changing of the shaft sealing rings and the shaft wearing sleeve

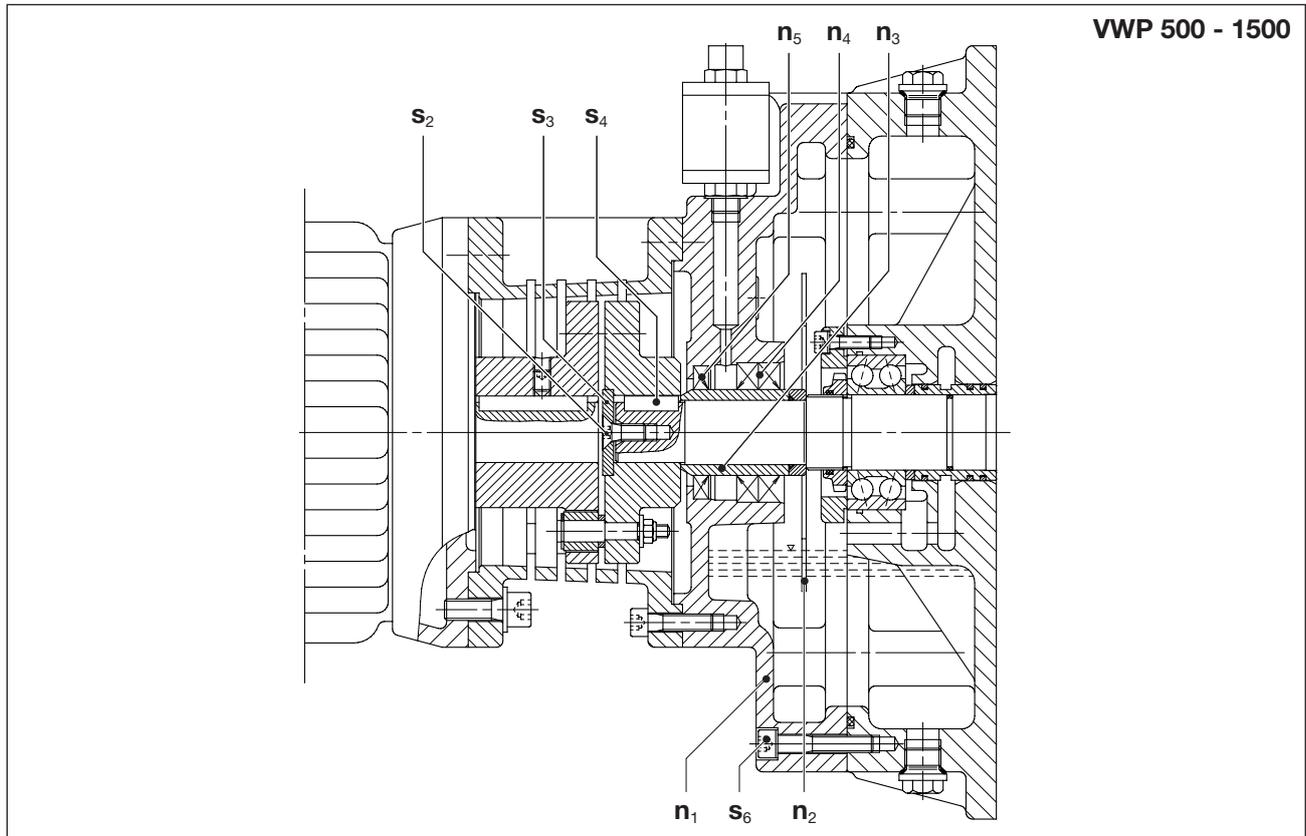


Fig. 12 Changing of the shaft sealing rings and the shaft wearing sleeve VWP 500 - 1500

Switch off the pumps and vent to atmospheric pressure.

After unscrewing the allen screws (Fig. 10, 11/s₁) pull off the motor together with the motor side coupling half (Fig. 10, 11/q) and suspend with the lifting device.

VWP 500 - 1500

After unscrewing the screws (Fig. 10/s₅) remove the motor flange (Fig. 10/n). Unscrew countersunk screw (Fig. 12/s₂) and remove with disc (Fig. 12/s₃). Pull off the coupling driven (Fig. 10/q₁) with a suitable puller. Remove key (Fig. 12/s₅). Drain the oil in the chamber on the motor side by unscrewing the plug (K₁). After unscrewing the allen screws (Fig. 12/s₆) lever out the intermediate flange (Fig. 12/n₁) in the area of the fixing pin. The splash plate (Fig. 12/n₂) must have a vertical position with their recess, otherwise it is impossible to remove the intermediate flange. Remove wearing sleeve (Fig. 12/n₃) of the piston and change it. Push off sealing rings (Fig. 12/n₄) resp. (Fig. 12/n₅) with a drift from the motor side out of the intermediate flange (Fig. 12/n₁) and change them. Re-assemble in reverse order.

NOTICE

For filling the sealing oil chamber with oil remove the ventilation screw (Fig. 2/G₁).

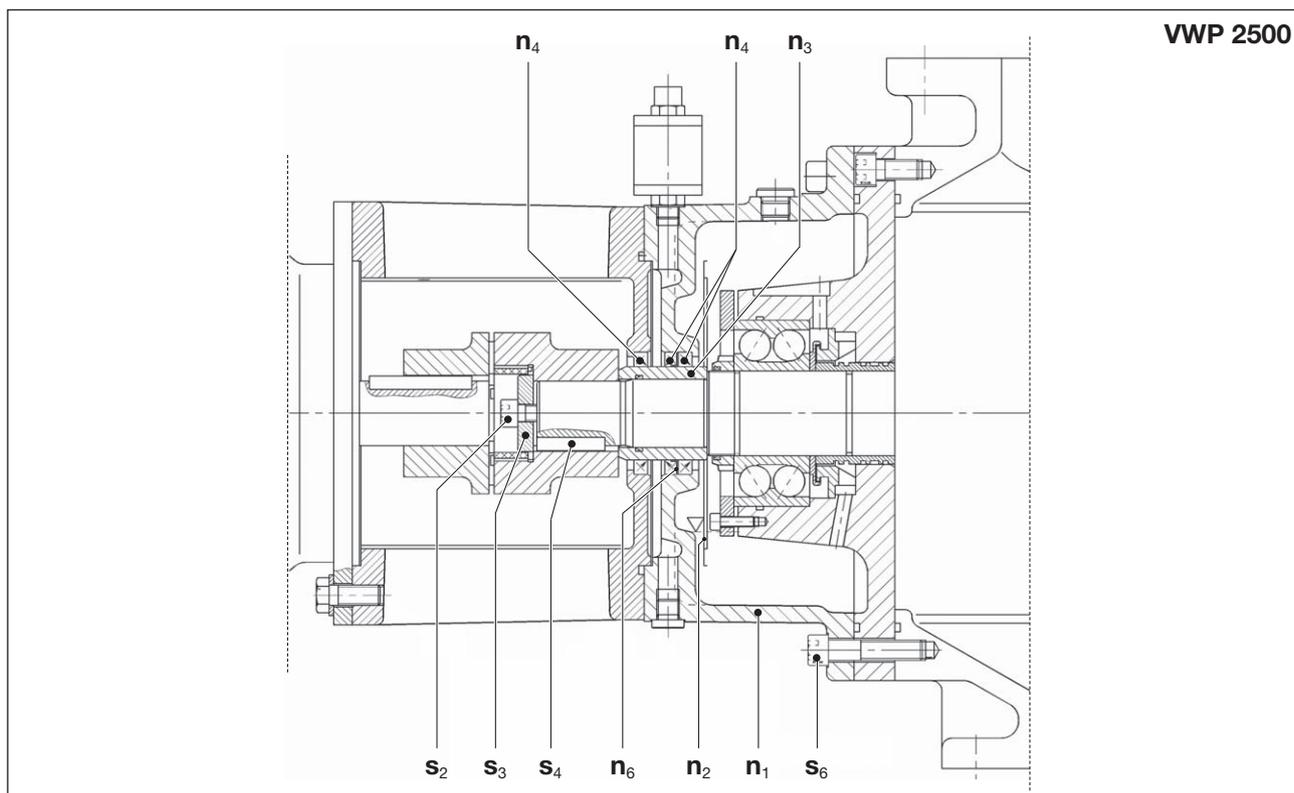


Fig. 13 Changing of the shaft sealing rings and the shaft wearing sleeve VWP 2500

VWP 2500

After unscrewing the screws (Fig. 10/s₅) remove the motor flange (Fig. 11/n). Unscrew screw (Fig. 13/s₂) and remove with disc (Fig. 13/s₃). Pull off the coupling driven (Fig. 13/q₁) with a suitable tool from the shaft end. Remove key (Fig. 13/s₄). Drain the oil in the chamber on the motor side by unscrewing the plugs (Fig. 3/K₁) and (Fig. 11/K₃). After unscrewing the screws (Fig. 11/s) remove motor flange (Fig. 11/n). Remove screws (Fig. 13/s₆). To pull off the intermediate flange (Fig. 13/n₁), two screws should be screwed into the two threads Fig. 3/a₆. Remove wearing sleeve (Fig. 13/n₃) of the piston. Push on new wearing sleeve and O-ring. Take care that the O-ring is not damaged. Push off sealing rings (Fig. 13/n₄) and supporting ring (Fig. 13/n₆) with a drift out of the motor flange (Fig. 11/n) and intermediate flange. Mount new sealing rings and supporting ring. Take care on right fitting position. Mount intermediate flange (Fig. 13/n₁) and motor flange (Fig. 11/n). Take care that the sealing rings are not damaged on the keyway eventual use a protection sleeve. Re-assemble of the remaining components in reverse order. Fill oil in bearing and sealing oil chamber.

NOTICE

For filling the sealing oil chamber with oil remove the ventilation screw (Fig. 3/G₁).

7.3 Repair/ Service

- a) For on site repair work the motor must be disconnected from the mains by a qualified electrician so that it cannot be started up again accidentally. For repairs use the manufacturer, its branch offices or authorised dealers. Please contact the manufacturer for the address of the service centre responsible for you (see Manufacturer's address).

Fig. 14 Clearance certificate 7.7025.003.17

NOTICE

For each machine that is sent to an Elmo Rietschle Service centre for inspection, maintenance or repair, a fully completed, signed declaration of harmlessness must be enclosed. The declaration of harmlessness is part of the supplier's documentation.

- b) After a repair or re-commissioning, the actions listed under „Installation“ and „Commissioning“ must be carried out as for initial commissioning.

8 Malfunctions: Causes and elimination

Fault	Cause	Troubleshooting	Important
Machine is switched off by the motor protection switch	Mains voltage/ Frequency does not correspond with the motor data	Check by qualified electrician	Section 5.5
	Connection to motor terminal board is not correct		
	Motor protection switch is not set correctly		
	Motor protection switch is triggered too quickly	Use a motor protection switch with an overload-dependent delayed switch off that takes into consideration the short term excess current at start up (version with short circuit and overload trigger as per VDE 0660 Part 2 or IEC 947-4)	
Pumping capacity is insufficient	The mesh filter is dirty	Clean or replace the mesh filter	Section 7.2.2 Section 7.4
	The suction pipe is too long or too narrow	Check the hose or the pipe	Section 5.3
	Machine or system leaking	Check the pipework and screw connections for leaks and to ensure that they are firmly seated	Section 7.2

Fault	Cause	Troubleshooting	Important
Pre-pump does not reach ultimate vacuum	Machine or system leaking	Check the pipework and screw connections for leaks and to ensure that they are firmly seated.	Section 7.2
Machine gets too hot	Ambient or intake temperature is too high	Ensure it is being used properly	Section 2.3
	Cooling air supply is obstructed	Check environmental conditions	Section 5.1
		Clean ventilation slots	Section 7.2
Sealing oil degrades rapidly	Sealing rings and the wearing sleeve of the shaft feedthrough are worn out	Change sealing rings and the wearing sleeve of the shaft feedthrough	Section 7.2.4
The machine makes a abnormal noise	Deposits on the rotary piston	Clean the working space and the rotary piston	Elmo Rietschle Service
	The coupling rubbers are worn	Replace coupling rubbers	Section 7.2.1
Please contact Elmo Rietschle Service for other malfunctions or those that cannot be eliminated.			

9 Technical Data

R-VWP			500	1000	1500	2500
Sound pressure level (max.) EN ISO 3744 Tolerance ± 3 dB(A)	dB(A)	50 Hz	79	80	82	82
		60 Hz	83	86	87	87
Sound power level	dB(A)	50 Hz	-	-	-	-
		60 Hz	-	90	92	92
Weight *	kg		100	180	225	342
Length *	mm		871	931	1058	1192
Width	mm		315	418	738	535
Height	mm		260	370	370	454
High-vacuum connection			DN 100 DIN 28404	DN 160 DIN 28404	DN 160 DIN 28404	DN 150 DIN 2501
Pre-vacuum connection			DN 100 DIN 28404	DN 100 DIN 28404	DN 100 DIN 28404	DN 100 DIN 2501
Correct amount of oil	l		1,5	3,5	3,5	2,8

* The length and the weight may differ from the information listed here depending on the motor manufacturer.



**Elmo
Rietschle**
A Gardner Denver Product

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Gardner

Denver

Elmo Rietschle is a brand of
Gardner Denver's Industrial Products
Division and part of Blower Operations.

EC - declaration of conformity 2006/42/EC

Hereby the manufacturer confirms: Gardner Denver Schopfheim GmbH
Postfach 1260
D-79642 Schopfheim

that the machine: Roots vacuum pump

of the: Series: R-VWP 500
Type: R-VWP 500, R-VWP 1000,
R-VWP 1500, R-VWP 2500

is conform to the regulations of the guideline indicated above.

The following harmonized and national standards and specifications are applied:

EN 1012-1:2010 Compressors and vacuum pumps — Safety requirements — Part 1:
Compressors

EN 1012-2:1996+A1:2009 Compressors and vacuum pumps — Safety requirements — Part 2:
Vacuum pumps

These declarations of conformity are invalid when the machine has been modified without prior approval by us and the approval has been documented in writing.

Name and address of the EC person in charge for documentation Gardner Denver Schopfheim GmbH
Postfach 1260
D-79642 Schopfheim

Gardner Denver Schopfheim GmbH
Schopfheim, 1.12.2011



Dr. Friedrich Justen, Director Engineering

Gardner Denver Schopfheim GmbH

Roggenbachstr. 58, 79650 Schopfheim Phone: +49/(0)7622/392-0 Fax: +49/(0)7622/392-300

Repairs and/or maintenance of vacuum pumps and components will only be carried out if a declaration has been filled in correctly and completely.

If not, the repair work cannot be started and delays will result.

This declaration must only be filled in and signed by authorised qualified staff.

1. Type of vacuum pumps/ components	2. Reason for the submission
Type description: _____	_____
Machine number _____	_____
Order number: _____	_____
Delivery date: _____	_____

3. Condition of vacuum pumps/ components	4. Contamination of the vacuum pumps/ components when in use
Was this being operated? YES <input type="checkbox"/> NO <input type="checkbox"/>	Toxic YES <input type="checkbox"/> NO <input type="checkbox"/>
Which lubrication was used? _____	Corrosive YES <input type="checkbox"/> NO <input type="checkbox"/>
Was the pump/ component emptied? (Product/Consumables) YES <input type="checkbox"/> NO <input type="checkbox"/>	Microbiological*) YES <input type="checkbox"/> NO <input type="checkbox"/>
Has the pump/ component been cleaned and decontaminated? YES <input type="checkbox"/>	Explosive*) YES <input type="checkbox"/> NO <input type="checkbox"/>
	Radioactive*) YES <input type="checkbox"/> NO <input type="checkbox"/>
	other YES <input type="checkbox"/> NO <input type="checkbox"/>

Cleaning agent: _____

Cleaning method: _____

*) Microbiological, explosive or radioactively contaminated vacuum pumps/ components will only be accepted with proof that they have been cleaned properly.

Type of toxic substance or process-related, dangerous reaction products with which the vacuum pumps/ components came into contact:

Trade name, manufacturer's product name	Chemical name	Hazard class	Action to be taken if toxic substances are released	First aid in the event of accidents
1				
2				
3				
4				

Personal protection measures: _____

Hazardous decomposition products when subjected to thermal load YES NO

Which? _____

5. Legally binding declaration

We swear that the information in this declaration is accurate and complete and that I, the undersigned, am in a position to judge this. We are aware that we are liable to the contractor for damage caused by incomplete and inaccurate information. We undertake to release the contractor from any damage claims from third parties arising from incomplete or incorrect information. We are aware that, regardless of this declaration, we are directly liable to third parties including in particular the contractor's staff entrusted with handling or repairing the product.

Company: _____

Street: _____ Post code/ Town: _____

Phone: _____ Fax: _____

Name (in capitals) _____ Position: _____

Date: _____ Company stamp: _____

Legally binding signature: _____