

Eurovacuum EVR Series

Roots Vacuum Pumps

Operating Instructions

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The	Thank you for choosing an Eurovacuum EVR series roots pump.				

We reserve the right to modify the design and improve the technique without prior notice.

Safety



Please read these operation instructions carefully.

Instructions must be strictly observed during the installation, operation and maintenance. Only trained personnel may operate and repair this product.

For the further information about safe operation and maintenance, please contact the Eurovacuum service department.



Warning: Failure to observe the following precautions may cause serious person injury or damage to vacuum pump.

- 1. Power supply must be disconnected prior to any maintenance and service operation for the pump.
- 2. Never start the pump with any of the parts removed or serious damage may result.
- 3. Make sure the exhaust pipe is not blocked and is free of obstacles.
- 4. Pressure differential of pump must not excess the allowable value, even if exhausted gas must be collected or stored in a tank.
- 5. The standard pump is not suitable for any explosive use. If it should be used in such process, contact us please.
- 6. The pump is not suitable for pumping of flammable gas, explosive gas, high oxygen content gas, radioactive gas and toxic gas.
- 7. Check if the protective switch in the motor circuit is suitable before the first starting of the pump
- 8. When designing the control circuit of the device, it is required to make sure the pump should be started in manual mode if it has been stopped in failure.
- 9. Never expose any part of the human body to vacuum.
- 10. Never operate the pump if the inlet or outlets have been removed.
- 11. The pump should be installed horizontally.
- 12. Flammable materials should not be stored near the pump. Danger excists of burning due to the external surface temperature in excess of 80° C during the operation of the pump.
- 13. Besides the pump, either the temperature of pipeline or accessories may excess 80°C, Do not touch them to prevent from burning your skin.
- 14. Avoid long-time staying in an environment with a high noise device, it is necessary to wear ear protection.
- 15. Make sure the pumped gas is compatible to avoid danger before the pump can be put into use.
- 16. Prevent small objects such as screws, nuts, washers, welding slag, iron beads from getting sucked into the pump.

- 17. The pump is unsuitable for applications that produce grinding material, grinding powder and condensable steam. Adhesive or heavy viscosity deposit may be remained after procedures, use a proper separator at first.
- 18. Before pumping vapors, it is necessary to operate the pump to attain its operating temperature at first, during this time the pump should be disconnected with system to avoid steam condensing in pump. In this case, we recommend the installation of condensers.
- 19. Exhaust pipe should be inclined downward to prevent liquid from entering the pump.
- 20. Never allow particles and liquid to enter the pump.
- 21. Both the inlet and outlet can be equipped with corrugated flexible hose to prevent the transfer of vibrations from the pump to other parts of the system.

Contaminated, deposited or cracked oil within the pump will affect performance and service life of the pump seriously.

Declaration of contamination

Should the vacuum pump be returned to Eurovacuum please clearly indicate whether the pump is free of materials harmful to health or whether the pump has been contaminated. If the pump has been contaminated, the nature of the hazard should be pointed out. Eurovacuum will not accept a pump without a "Declaration of contamination". See page 31.

Disposal of waste oil

Owners of waste oil are responsible to handle the waste oil properly. Do not mix waste oil with other materials.

Common disintegrated oil due to mechanical wear, oxidation, high temperature and etc. should be disposed of by waste oil treatment system.

The name of contaminant contained in the waste oil must be marked clearly, and the contaminated waste oil must be disposed of as special waste material.

Only a authorized handler can transport and dispose of waste oil according to the applicable international, national and local laws for waste treatment.

1 Description

1.1 Overview

As a mechanical type vacuum pump equipped with a pair of dual-leaf rotors rotating in high speed, roots vacuum pump can realize the gas intake and exhaust by the rotation of the two figure-eight shaped rotors in a pump housing. This operating principle is similar to that of roots blower. Because the pump is operated in low pressure range, which with the long free path of gas molecule and the great resistance of gas leaking through micro gap a high compression ratio is possible. The pump can be used as a booster device; however it can't exhaust gas into the atmosphere directly, and should be used in connection with a backing vacuum pump. The pumped gas can be released into the atmosphere via the backing vacuum pump.



Fig. 1 Diagram of roots pump

1.2 Features

- (1) Clearance exists between rotors and pump housing to eliminate the mutual contact, thus the pumping chamber of Roots pump is free of lubricants.
- (2) Rotor has features of good geometric symmetry, so the pump can be operated at smooth running, low noise and high direct linking rotation speed with strong structure and high pumping speed.
- (3) No compression action exists in the pump housing like the other mechanical vacuum pump, therefore no exhaust valve is required, and so the pumps can be used for pumping of condensable gas.
- (4) It can be launched quickly to achieve ultimate vacuum in a short period. Low power and low cost for operation maintenance.

Roots pump can be widely used for vacuum degassing, molten steel vacuum treatment, vacuum heat treatment in vacuum metallurgical industry as well as in chemical, medicine, foods, motor manufacturing and other industries. If a two-stage water ring pump is used as backing pump, gas containing large amounts of water vapor can be pumped out, hence it is suitable to use roots pump in processes of distilling, evaporating, freezing, drying etc.

Sense of pump model: for example EVR-4500BM EVR ---Roots booster pump 4500---Pumping speed (B indicates equipped with bypass relief valve, M indicates equipped with magnetic drive)

1.3 Principle of operation

The principle of operation is explained in figure 2.



Figure 2 Work sequence position diagram of pump

During the operation the pumped gas will enter the space between the rotors and the pump body via the gas inlet, the rotor and pump body will enclose the gas away from the inlet, and the separated gas (in the shaded area as figure) will be moved to outlet with the continuous rotation of the rotors. In position (1) of figure 2, the gas in V₀ is in enclosed condition, thus there is no compression or expansion. When the top of rotor rotates to the edge of outlet, the gas is moved to the outlet side; the gas in V₀ will be compressed to make the pressure in the connected volume even because the pressure in V₀ is lower than that of outlet. As the rotors rotate further, the compressed gas is exhausted via the outlet. Meanwhile, the other side of rotor and the connected part with inlet will intake the gas. With the continuous rotation of the rotors, the pumping process above will be realized repeatedly to exhaust the gas uninterruptedly. The working process can be expressed as rotor space increases to the maximum from the minimum value, and then reduces to the minimum value, which is just the volume action principle of the roots pump. Roots pumps operate under a rather low inlet pressure. For the much high rotation speed of rotor (2860 rpm), the linear speed of rotor surface is approximate to the heat motion speed of gas molecule, in this case the gas molecule impacted on the rotor will be moved to the outlet with relative high pressure by the rotation of rotor, then be exhausted by backing vacuum pump. It is just the molecule action principle of the pump.

Combined with the action of the two principles, the pump has features of high pumping speed and stable pumping speed curve in the pressure range (1~500Pa).

1.4 Principle of bypass relief valve

When the pump is equipped with a bypass relief valve between the inlet and outlet, it limits the pressure differential between the inlet and outlet within rated value range. In case of pressure differential beyond the rated value, the valve will automatically open to connect the inlet to the outlet. If the pressure differential is lower than the rated value the relief valve will close automatically.

Various types of backing pumps can be chosen depending on the working condition according to the features of the roots pump. Especially in the case that low requirements on vacuum degree, meanwhile it is required to eliminate the gas containing large amount of steam or some dust or weak corrosive. Eurovacuum can design customized various roots pump series units according to the various performance requirements on vacuum device and working conditions given by users.

2 Performance specification

2.1 Performance curve

(For the information of other models, typical curve can be referred proportionally)

(1) Curve of pumping speed versus inlet pressure for EVR-500B, 1000B (refer to figure 3);

(2) Curve of pumping speed versus inlet pressure for EVR-2000B, 4500B (refer to figure 4);





Model			EVR-125B	EVR-250B	EVR-500B	EVR-1000B	EVR-2000B	EVR-4500B	EVR-7000B	EVR-9000B
	50HZ	м ³ . г. ⁻¹	108	250	540	1080	2160	4320	6480	0006
Nomina pumping speed	ZH09	= ≥	127	300	650	1300	2590	5200	7780	10800
Ultimate pressure		Ра	3×10 ⁻²	3×10 ⁻²	3×10 ⁻²	3×10^{-2}	3×10^{-2}	3×10^{-2}	3×10 ⁻²	3×10^{-2}
Pressure differential of relief v	alve	Ра	5×10^3	5×10^3	4.8×10 ³	$5.8 imes 10^3$	3.2×10 ³	$4.4 imes10^3$	3.2×10 ³	4.4×10^{3}
Permissible ambient temperati	ures	Ç	$5{\sim}40$	$5{\sim}40$	$5{\sim}40$	$5{\sim}40$	$5{\sim}40$	$5{\sim}40$	$5{\sim}40$	$5{\sim}40$
Mains voltage at the motor, 50HZ		>	380	380	380	380	380	380	380	380
Motor power, 50HZ		КW	0.75	1.1	2.2	4	2.7	11	15	18.5
Rotation speed, 50HZ		RPM	2825	2825	2840	2890	2900	2900	2930	2930
Protection		ЧI	44	44	44	44	44	44	44	44
Oil filling for gear box			0.8	0.8	2.8	2.8	2.7	7.5	10.5	10.5
In Flange internal diameter	utlet	MM	50 40	80 50	100	150	200	250 200	250 250/200	320 320/250
Pipe connections M	Vater inlet			_	iç T	"¢, t ("C) F ("O T C	"O' F (
(External diameter)	Vater outlet		/	/	פווע	פו/ב	פווע	ם ו/כ	פווק	2/10
Cooling water supply		L · h ⁻¹	/	/	1500	1800	2100	2400	3000	3600
Weight with motor		Kg	20	85	220	310	062	950	1200	1500
Shipping weight		Kg	110	125	270	380	850	1050	1320	1650
Noise level under ultimate pressure		dB(A)	68	69	72	74	26	78	62	80

2.2 Technical Data

3 Installation

3.1 Pipe Connections

- 1. Check if any part of the pump is damaged prior to installing and if it fully complies with the requirements on the product contract.
- 2. Install the pump at a clean place where it is free of dust so that it can't be contaminated. Air inlet of pump should be fitted with essential accessories according to the practical operating situation (for example, dust proof equipment or condenser should be provided if oil sealed type mechanical pump is used as backing pump).
- 3.The pump's ambient temperature should be between 5 $^{\sim}40^{\circ}$ C, and the maximum temperature should not exceed 100 $^{\circ}$ C. Lower temperatures hamper start-up, higher ones shorten the oil change intervals and may lead to greater wear.
- 4. The base can be installed on a concrete foundation or a steel frame according to practical condition, however horizontal is necessary or the normal running of pump may be impaired.
- 5. The flange face of inlet pipe should be kept in parallel with that of the pump, and perfect concentricity must be maintained to prevent the pump body from distortion.
- 6. Make sure the inlet pipe and outlet pipe are sealed properly, any minute leak will affect the vacuum degree.
- 7. Take the principle of short as possible when determining the length of pipe, use less joints or elbows as possible and the diameter of pipe should be no smaller than that of inlet of pump.
- 8. Provide flexible connections such as metal bellows in the connecting pipe between the roots pump and the backing pump to isolate vibrations and prevent the roots pump from getting damaged due to the vibration of the backing pump.
- 9. It is better to install a vacuum valve in the inlet and outlet pipe of pump to make sure the pump housing can still maintain vacuum after pump is shut down.
- 10. If solid particles are mixed in the gas flow, it is required to provide a filter screen at intake port, Especially for a newly built device a filter is necessary.
- 11. Inlet pipe of cooling water should be provided with a valve, which is capable of adjusting water flow rate to control the temperature of discharging water within 20~40°C during running. Notice the water temperature should not be higher than 40°C to avoid scale deposited in water jacket.
- 12. If the pump is subjected to freezing temperature, the water tank and circulating pump should be installed with anti-freeze in the water.
- 13. Before storing the pump always disconnect the water inlet and outlet connection and drain out the water.



14. It is necessary to use a fore vacuum pump as backing pump, never use the roots pump solely! If the roots is operated in connection with a oil sealed typed mechanical vacuum pump which serves as backing pump, it is still unsuitable for pumping gas containing much oxygen, explosive gas, corrosive gas, gas subject to occur chemical reaction with vacuum oil and gas containing much dust, or the service life of backing pump may be affected.

3.2 Electrical Connections

Connect the motor and other control devices such as solenoid valves and temperature switch according to the proper voltage and current indicated on the nameplate of each component. Turn the pump by hand after wiring is completed and make sure there are no obstructions and the pump turns freely. Then run the motor shortly to check the direction of rotation. If the pump does not rotate in the correct direction as marked on the drive end cover, interchange any two of the three-phase leads.

3.3 Lubrication

In normal conditions the pump is filled with lubricating oil when it leaves the factory. We recommend the use of EV-Highvacuum Oil-60 (order nr. 100400) for EVR series Roots pumps.

4 Operation

4.1 Pre-start check

- (1) Open the valve mounted in the cooling water pipe and keep the cooling water circuit unobstructed;
- (2) Check if the vacuum oil in gearbox and end cover is sufficient, the oil level should be up to the specified line on sight glass. The extended shaft seal oil cup should be frequently filled with vacuum oil and kept clean to prevent any particles from entering. It is recommended for new pumps to change the oil after 30~50 hours of operation. Oil changing intervals can vary depending on the practical operating condition afterwards;
- (3) Air inlet should be equipped with dust proof equipment or filtering equipment if the sucked air contains much powder dust or other metal powder. It is necessary to take neutralization measures if the corrosive gas is sucked;
- (4) Check and refit loose parts and make sure the rotation direction of motor complies with the direction of arrow marked on pump.

4.2 Startup

- (1) Start the backing pump;
- (2) Open the air intake valve of the roots pump;
- (3) Start the roots pump and open the cooling water valve as soon as the pump is started.
- (4) The rotation of the pump should be stable and without impact.
- (5) Oil leak at the shaft seal is not permitted;
- (6) The pump should be stopped immediately and be examined if the temperature rises fast, the reading of the current meter changes suddenly or any irregular noise or impacting sound or any other abnormal condition should occur during the operation.

Caution: Operating pressure differential of pump should be limited within the allowable range of relief valve, or abnormal noise may be made when the pump is running. Further more it may cause motor overload. Abnormal noise is made during the starting of pump, however, it fades away with the running of the pump and the increasing of vacuum degree, which is caused by the relief valve tripping due to pump overload, for the reason that permissible pressure has not reached when start the roots pump. Solution: start the roots pump and cut it in upon reaching the cut-in pressure. A simple method can be used to determine if a permissible cut-in pressure has reached: start the backing pump until the automatic rotation of roots pump is stopped.

4.3 Operation

The pump should never be run with the inlet or discharge pipe removed. The screws of the flanges on the suction and the pressure side must not be loosened in the presence of vacuum even if the pump is not running.

During operation of the roots pump, check the oil level and the condition of the oil in the oil level sight glass and the oil cup from time to time. Correct as required (see section 5.2). Normally, the oil is water clear or light brown. If it turns dark, this is a sign of early ageing due to excessively high temperatures.

4.4 Shut down

- (1) Close the intake valve on inlet pipe firstly;
- (2) Shut down the roots pump (meanwhile close the exhaust valve);
- (3) Shut down the backing pump;
- (4) Close the inlet valve of cooling water;
- (5) Residual water in water jacket must be drained completely when storing the pump for a long period of time in a cold area or the residual water may be frozen to damage the inside of the pump.

5 Maintenance 5.1

General

- 1. Check frequently and keep the pump room clean and dry.
- 2. Check frequently the lubricating oil in each part and refill if necessary. Change any contaminated oil in time and make sure the oil plug is sealed properly.
- 3. Operating pressure differential of pump should be limited in the allowable range of relief valve, or the motor may be damaged.
- 4. Never hit parts with a heavy hammer when dismounting.



- 5. Disconnect the electrical power before disassembling the pump and vent the pump to atmospheric pressure. Make absolutely sure that the pump cannot be accidentally started.
- 6. If the pump has been pumping harmful substances, suitable safety measures should be taken.
- 7. All maintenance and cleaning work must be carried out by qualified personnel only.

5.2 Oil Change

Three parts of Roots pump should be lubricated with vacuum oil: both sides bearing housings (Gear box) and the oil seal seat. (In case of M-version this is not needed) For EVR-1000 and smaller size pumps, the bearing housings of both sides are interconnected. For EVR-2000 and larger size pumps, the bearing housings of both sides are separated and each is provided with an oil sight glass respectively.

We recommend the use of EV-Highvacuum Oil-60 (order nr. 100400)



Caution: never fill oil if the pump is running.

5.2.1 Oil change / Bearing housing (Gear box)

The correct oil level should be maintained between the two marks at the oil sight glass (7/1) or (7/7) when the pump is running. If the oil level is too low, the bearings and gearwheels are not lubricated adequately; if it is too high, too much oil would cause high temperature rising.

We recommend that the oil in the new pump should be changed after the first 500 hours of operation. Then, under normal operating conditions, change the oil after every 3000 hours of operation. Change the oil more frequently if pumping corrosive vapors or large amounts of dust or where excessive operating temperatures encountered.

- 1. Unscrew the oil-drain screws (7/2) or (7/8) and the oil-fill screw (7/5) or (7/6) and drain the oil.
- 2. Clean the sealing surface and firmly reinstall the oil-drain screw (7/2) or (7/8) using a gasket which is in perfect condition. Wipe off any oil residues from the housing.
- 3. Fill in new oil.

4. Clean the oil-fill port and reinstall the screw (7/5) or (7/6) using a gasket which is in perfect condition. Wipe off any oil residues from the housing.

The oil-fill and oil-drain port must be sealed air-tight.



Caution: Before removing the oil-drain or oil-fill screw always switch off the pump first and vent to atmospheric pressure.



When the pump has become warm during operation, the housing and the oil temperature may exceed 80 °C. Leave the pump to cool down. Always wear protective gloves also to protect yourself against aggressive residues in the oil.

5.2.2 Oil change / Oil seal seat (for non-magnetic drive)

An oil cup is provided at oil seal seat. When the pump is cold, the proper oil level should be 1/2 of the height of the oil cup.

The oil in the oil seal seat should be changed every 3000 operating hours.

- 1. Unscrew the oil-drain screw (7/3) under the oil seal seat, drain out the oil and screw in the oildrain screw using a gasket which is in a perfect condition.
- 2. Fill in fresh oil at the oil cup (7/4). The oil level for the oil seal seat must be visible in the oil cup.
- 3. Wipe off any oil residues from the housing.

5.3 Cleaning the pumping chamber

Under dirty operating conditions, contaminants may be deposited in the pumping chamber or on the rotors. After removing the two connecting lines, the contaminants can be blown out with dry compressed air or flushed out with a suitable solvent.

Contaminants that cannot be blown or flushed out can be removed completely from the pumping chamber with a wire brush, metallic sponge or scraper.

During cleaning, the rotors must be turned only by hand.



5.4 Checking the relief valve

Remove the screws (8/1) and take off the cover (8/2) with O-ring (8/6).

Take out the poise (8/3) by using some proper bolts.

Check the poise washer (8/4) or O-ring . For EVR-500B and larger size pump, if the poise washer is damaged, remove the screws and take off the poise cover (8/5). take out the poise washer (8/4) and replace it. (for EVR-250B and smaller size pump). if the O-ring is damaged, pull it out and replace it.

Clean all parts or replace them if necessary. Reassemble in the reverse sequence.



5.5 Exchanging the shaft seals (for non-magnetic versions only)

The series EVR roots pump's shaft is sealed with oil seals. In order to reduce wear on the shaft these shaft seals run on a sleeve.

A dropping oil level in the oil cup is a sign for malfunctioning shaft seals.

When the oil level in the oil cup drops and when no oil appears in the Framework (12/72), it is likely that the inner shaft seal is faulty. When the oil level in the oil cup drops and when oil appears in the Framework (12/72), it is likely that the outer shaft seal is faulty. In these cases above, the oil seal seat can be moved 2mm in axial to keep away from the worn position, if still in failure, the shaft seals may be aged and should be exchanged in time.

- 1. Unscrew the oil-drain screws (7/3) and drain out the oil. See Fig. 7.
- 2. Unscrew the bolt (12/84) and remove the motor (12/85) with motor coupling (12/82). Take out the elastic block (12/81). See Fig. 12.
- 3. Pull off the Shaft coupling (12/80) using a puller.
- 4. Unscrew the bolt (12/79), eject the Oil seal seat (12/78) by using proper bolts.
- 5. Take the retainer rings (12/74) from the oil seal seat (12/78) by using a clamp.
- 6. Remove the washer (12/75).
- 7. Take out two pieces of shaft seal (12/76) from the oil seal seat (12/78).
- 8. Unscrew the screw (12/63) and remove the Framework (12/72). Take out the O-ring (12/70) and (12/71).
- 9. Pull out the oil-sealing sleeve (12/69) from the shaft. Take out the O-ring (12/68) and Oil-sealing inner sleeve (12/67).
- 10. Exchange the shaft seals and the sleeves against new parts. Clean all other parts and replace them as required.

Reassemble the parts in the reverse order as for disassembly.

Before starting the pump, fill in the required amount of oil at the oil cup (12/73) (see

Section 5.2.2).





6 Troubleshooting

Fault	Possible cause	Remedy	Repair
Pump does	Motor is connected incorrectly.	Connect the motor correctly.	3.2
not start.	Oil is too thick.	Change the oil or warm the oil and the pump.	5.2
	Motor rotor is malfunctioning.	After sales service.	_
	Pump has seized up: damaged rotors, bearings or gearwheels.	After sales service.	_
Motor	Large foreign material entering pump housing	Remove any foreign material	5.3
	Relief valve is blocked due to heavy rust.	Dismount and clean the relief valve and reassemble it in place	5.4
Pump gets too hot.	Ambient temperature is too high or cooling water supply is obstructed.	Install the pump at a suitable site or ensure enough cooling water supply.	2.2/3.1
	Pump is working in the wrong pressure range.	Check pressure values of vacuum system.	2.2/4.2
	Pressure differential is too great.	Check pressure values of vacuum system.	2.2/4.2
	Gas temperature is too high.	Check the vacuum system.	_
	Clearance between housing and rotors is too small due to: - contamination - distortion of pump.	Clean the pumping chamber. Ensure that the feet and connecting lines aren't placing a strain on the pump.	5.3 3.1
	Excessive frictional resistance due to contaminated bearings and/or oil.	Change the oil.	5.2
	Oil level is too high.	Drain some oil to reach the correct level.	5.2
	Oil level is too low.	Add oil to reach the correct level.	5.2
	Wrong oil has been used.	Drain oil and fill in correct lubricant.	5.2
	Bearings are malfunctioning.	After sales service.	_
	Relief valve is malfunctioning.	Clean or repair the valve.	5.4
Power	See fault "pump gets too hot".	See fault "pump gets too hot".	_
of the motor is	Wrong mains voltage supply for the motor.	Connect the motor to the correct voltage supply.	2.2
loo nign.	Motor is malfunctioning.	Repair the motor or exchange it.	_
	Oil is too thick.	Change the oil or warm up the oil and the pump.	_

Fault	Possible cause	Remedy	Repair
Pump is too loud.	Clearance between casing and impellers is too small due to: - Contamination - Distortion of pump.	Clean the pumping chamber. Ensure that the feet and connecting lines aren't	5.3 3.1
	Bearing or gearing is damaged.	placing a strain on the pump. After sales service. Switch off the pump at once.	
	Coupling is damaged.	Replace the coupling (or elastic block).	_
	Rotors strike the housing.	After sales service. Switch off the pump at once.	_
	Rotor runs out of true.	After sales service. Switch off the pump at once.	_
	Relief valve is tripping.	Start the pump under a permissible cut-in pressure	4.2
Oil level in the oil cup drops	Oil leak is visible: Outer shaft seal is malfunctioning.	Exchange shaft seals.	5.5
	No oil leak is visible: Inner shaft seal is malfunctioning.	Exchange shaft seals.	5.5
Oil turns dark.	Oil has broken down.	Change the oil.	5.2
	Pump gets too hot.	See fault "pump gets too hot". After solving the problem change the oil.	_
Pumping speed of the	Motor fault.	After sales service.	_
pump is too	Pump or connected system has a leak.	Find and seal the leak.	_
IOW.	Poise washer in the relief valve is damaged	Replace the poise washer.	5.4
	Flow resistance in the intake or discharge line is too high.	Use intake and discharge lines of sufficient diameter.	-
	Screws on the pump are loose.	Retighten the screws.	_
	Filter screen in the intake flange is clogged.	Clean the filter screen	_
	Motor is connected incorrectly.	Check the rotation direction and connect the motor correctly.	3.2

Parts list for EVR-4500B

Item No.	Part Description	Item No.	Part Description
1	Free end cover	44	Driven rotor
2	Nut	45	End plate A
3	Cooling coil	46	Taper bolt
4	Expanding sleeve	47	Screw
5	Driven gear	48	Кеу
6	Bearing cover A	49	Drive shaft
7	Bearing 7312	50	Right feet
8	Bearing seat A	51	Left feet
9	Bolt	52	Screw
10	Oil deflector	53	Screw
11	Piston ring holder	54	Drive shaft sleeve
12	Piston	55	Oil splash disc A
13	Screw	56	Positioning plate
14	Prepumping unit	57	Round nut
15	O-ring	58	Screw
16	O-ring	59	Drive end cover
17	End plate B	60	Round nut
18	Drive gear	61	Lock washer
19	Oil splash disc B	62	Driven shaft sleeve
20	Spacer	63	Screw
21	Lock washer	64	Protective cover
22	Bolt	65	Screw
23	O-ring	66	Bearing seat B
24	Oil sight glass	67	Oil-sealing inner sleeve
25	Screw	68	O-ring
26	Housing	69	Oil-sealing sleeve
27	3/8″ plug screw	70	O-ring
28	O-ring	71	O-ring
29	Outlet cover	72	Framework
30	Bolt	73	Oil cup
31	Eye bolt	74	Retainer ring
32	O-ring	75	washer
33	Bolt	76	Shaft seal
34	Poise cover	77	O-ring
35	poise washer	78	Oil seal seat
36	Poise	79	Bolt
37	Screw	80	Shaft coupling
38	O-ring	81	Elastic block
39	Leader	82	Motor coupling
40	Screw	83	key
41	Valve cover	84	Bolt
42	O-ring	85	Motor
43	Inlet cover	86	Bearing cover B

Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, vacuum pumps and components will be carried out only if a correctly completed declaration has been submitted. Non-completion will result in delay. The manufacturer can refuse to accept any equipment without a declaration.

A separate declaration has to be completed for each single component.

This declaration may be completed and signed only by authorized and qualified staff.

Customer:			Reason for re	turn	🗷 appl	icable please mark	
Address :			Repair:	□ chargeable	□ warr	anty	
Oracleat			Austausch:	□ chargeable	□ warr	anty	
Phone :			Poturn only:		ady arranged	/ received	
Findle .			Calibration:				
			Calibration.				_
A. Description of product:			Failure descr	iption:			
Model:							
Article number :			Additional part	S:			-
Serial number:			Application too				-
			Application pro	ocess:			_
B. Condition of the equipment:	No ¹⁾	Yes No	Conta	mination :	No ¹⁾	Yes	
1. Has the equipment been used?			toxic				
2. Drained? (product/service fluid)			corros	ive			
3. All openings sealed airtight		□ (mandator	ry!) flamm	able			
4. Purged ?			explos	ive 2)			
if yes, state cleaning agent:			radioa	ctive 2)			
and which method of cleaning:			microb	piological ²⁾			
¹⁾ if answered with "No", continue with	n D.		other I	narmful substances			
properties of the substances accord Tradename: a) b) c) d) 2. Are these substances harmful? 3. Dangerous decomposition products If yes, which ? ²⁾ Components contaminated by micro evidence of decontamination.	ding to safety data	i sheet (e.g. to Chemical nan	xic, inflammable, ne: No Yes D D U D ive products/subs	corrosive, radioacti	ve)	out written	
D. Legally binding declaration							_
I/we hereby declare that the informati	on supplied on this	s form is accur	ate and sufficient	t to judge any contai	mination leve	el.	
Name of authorized person (use capit	tals)):						
Date	signature of aut	thorized perso	n	Company	stamp		
Eurovacuum	Head office Wilgenweg 17		Tel +31 Fax +31	(0)348560060 (0)348560075	VA IB,	AT: NL8173.85.423.B01 AN: NL06 INGB 0675 0926 55 31	

BIC: INGBNL2A

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3421 TV Oudewater

The Netherlands

EC Declaration of Conformity according to EC Machinery Directive 2006/95/EC

We Eurovacuum B.V. herewith declare, that the following machine complies with the appropriate basic and health requirements of the EC Directive based on its design and type as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Machine description:	Roots Booster Vacuum Pump.
Machine Type:	EVR-Series.
EVR- series • EVR- EVR-	125, EVR-250, EVR-500, EVR-1000, 2000, EVR-4500, EVR-7000, EVR-9000
Applicable EC Directive :	Low voltage directive 2006/95/EC Electromagnetic compatibility 2004/108/EC
Applicable Harmonized Sta	andards: EN1012-2:1996, A1: 2009 EN60034-1:2004 EN50581:2012

Date/Authorized Signature:

14 March 2013

Title of Signature:

M. Smit, CEO General Manager

Ausmin

Eurovacuum

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