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Eurovacuum Installations and Operating manual EVD Series Vacuum pumps Models: EVD-6 to EVD-90

Double Stage Oil Lubricated Rotary Vane Vacuum Pump

Eurovacuum EVD-Series

Double Stage Oil Sealed Rotary Vane Pumps

Eurovacuum Company is offering its various products to meet industrial vacuum needs.

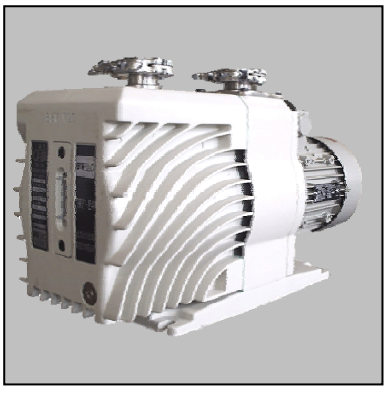
Eurovacuum Company is founded in 2006, with over 30 year experiences in the vacuum Industry its founders have been putting their best efforts continuously to produce high quality Oil Sealed Rotary Vane Pumps, with diverse range of capacity for use in the industry and laboratories in diverse applications.

Advantages to the User
- High pumping speed also at low pressures
- Low noise level
- Air-cooling, no water required
- Low space requirement, easy to install
- Maintenance-friendly
- Compact design
- Anti-Suckback valve to secure the vacuum in the system
- High water vapour tolerance
- Direct drive, Design requires no belts
- Wide range of accessories available for easy adaptation

Application Examples
- Car industry
- Food industry
- Furnaces and plants
- Laser technology
- Medicinal technology
- Metallurgy
- Power engineering, long-distance energy
- Space simulation
- Vacuum coating

3 TYPES AVAILABLE

SMALL SIZE
EVD-VE type
Pumping speeds from:
2,5 to 20 m^3/h
Ask for the EVD-VE catalog



MEDIUM SIZE
EVD type
Pumping speeds from:
5 to 90 m^3/h

LARGE SIZE
EVD-MVP type
Pumping speeds from:
50 to 630 m^3/h

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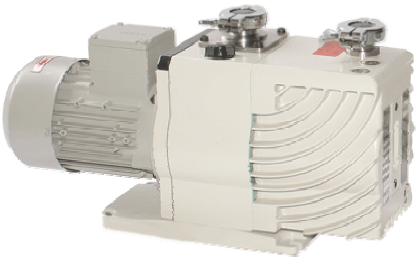
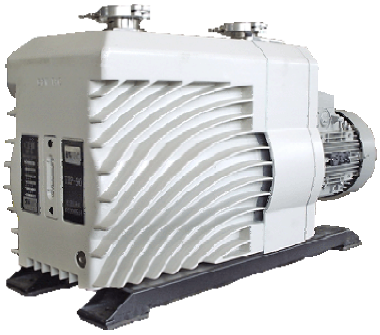
Contents





It is mandatory that these operating instructions be read and understood prior to the vacuum pump installation and start-up.

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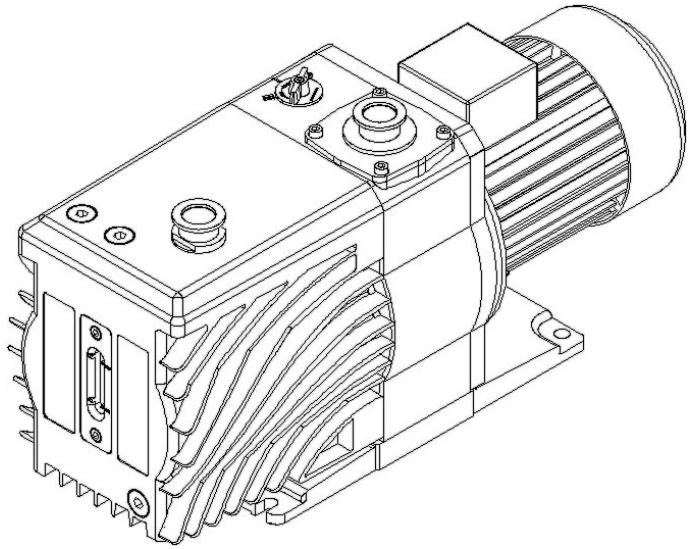


1. Inspection

Check the following upon receipt of the product:
- Is the product consistent with what you ordered?
- Is there any damage to the product due to any loosened screws in transportation?
- Does the product meet the requirements of order for goods?
- Please contact our Company in time if you find any damages, defects or any loss of parts.

2. Transportation

During transportation, any neglect may cause damages to the pump. Please handle with care.

3. Purpose and Range of Use

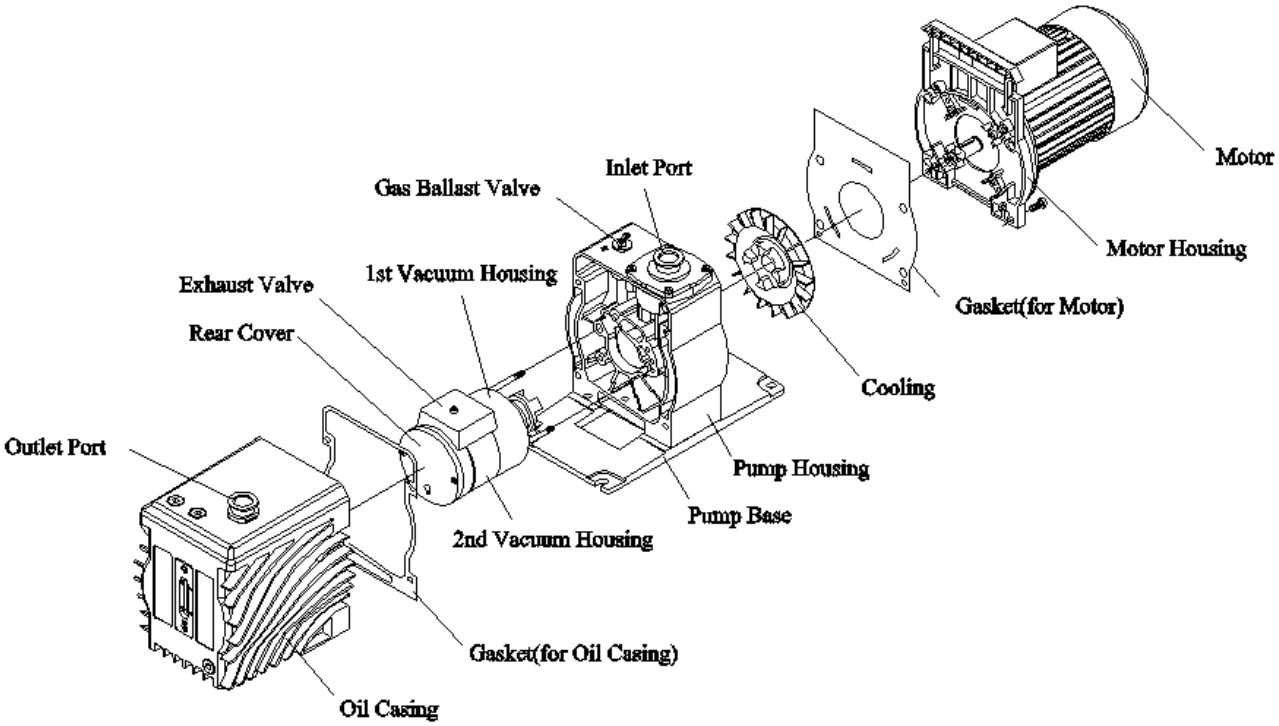
With a complete range of state-of-the-art production technology, process, modern machining center, CNC equipment, we produce seven types of high speed rotary vane vacuum pumps of the EVD-series. These pumps are one of the fundamental vacuum acquiring equipment in vacuum applications, they are widely used in scientific research and teaching the require high or low-vacuum environment, as well as in operation fields requiring an vacuum environment, such as auxiliaries to vacuum application equipment, auxiliaries to production lines in electronic and semiconductor industries, color kinescope exhaust production line, vacuum freeze drying, production of analytical instruments and electric light sources.

Not only can these pumps be used independently, but they can serve as backing pumps in both high and ultra high vacuum systems with molecular pumps, diffusion pumps, booster pumps, and Cryo pumps used in a matching manner.

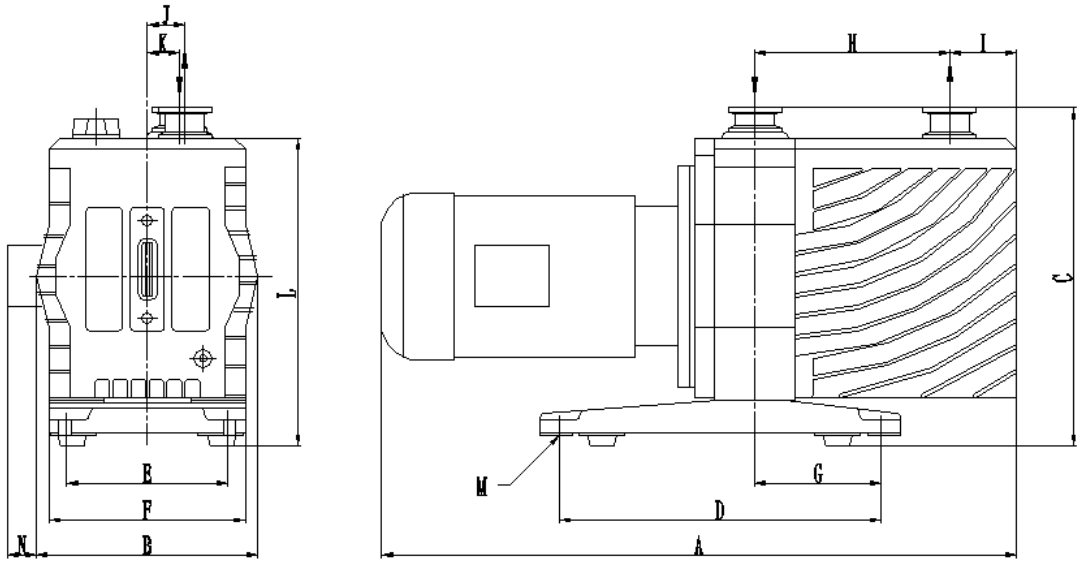
The pump cannot be used for dust removal and for any gases which are corrosive, explosive or have chemical reaction with metals or vacuum pump oils, nor can it be used as a compression pump or transmission pump.

Consisting of an anti-suckback valve system, a pressure oil circulating system, a convenient gas ballast valve control, etc., this pump is characterized by, among others, high vacuum, low noise, and no oil leakage and injection, providing excellent services for the users with its advanced performance and reliable quality.

4. External Pump Sketch



5. Outside Dimension
Model: EVD-6, EVD-12, EVD-24, EVD-36



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
EVD-6	470	165	252	240	120	146	94	120	50	24	28	229	Ø9	53
EVD-12	495	165	252	240	120	146	94	145	50	24	28	229	Ø 9	53
EVD-24	535	205	288	310	140	180	147	156	75	40	34	262	Ø 12	48
EVD-36	565	205	288/296	310	140	180	147	186	75	40	34	262	Ø 12	48

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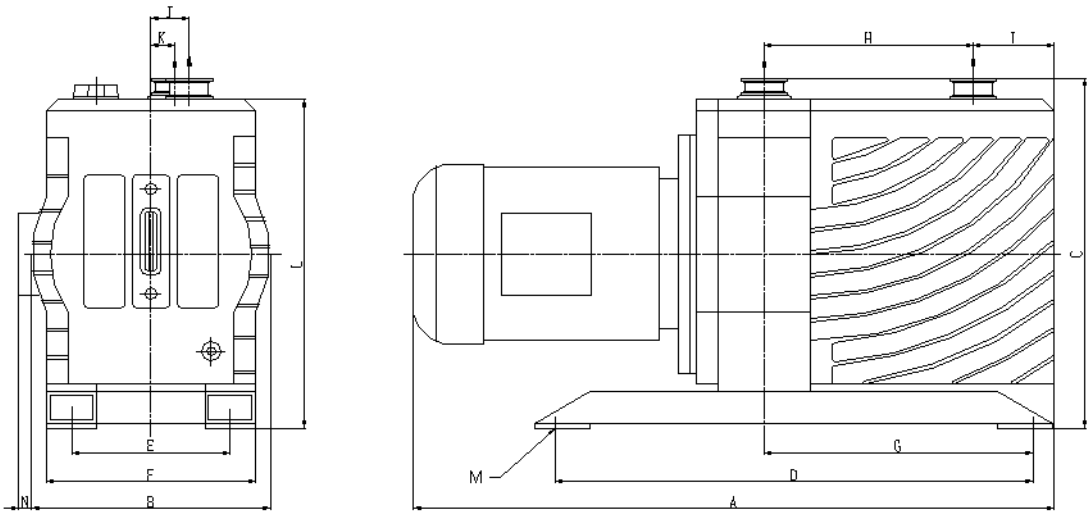
Model: EVD-48, EVD-60, EVD-90



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
EVD-48	680	250	335	485	155	215	290	235	80	28	45	310	Ø 14	20
EVD-60	730	280	410	550	185	245	310	245	95	28	45	385	Ø 14	0
EVD-90	801(780)	280	410	600	185	245	360	295	95	28	45	385	Ø 14	0

6. Technical Data

EVD-6, EVD-12, EVD-24, EVD-36

Technical Data		EVD-6		EVD-12	
		50 Hz	60 Hz	50 Hz	60 Hz
Nominal displacement	m^3/h	5,4	6,5	10,8	13
Ultimate partial pressure	mbar	10^{-4}	10^{-4}	10^{-4}	10^{-4}
Ultimate total pressure	mbar	$4 \cdot 10^{-3}$	$4 \cdot 10^{-3}$	$4 \cdot 10^{-3}$	$4 \cdot 10^{-3}$
Water vapour tolerance	mbar	50	50	50	50
Motor power	kW	0,37	0,37	0,37	0,37
Nominal speed	rpm	1450	1750	1450	1750
Noise level	dB(A)	50	52	50	52
Oil capacity	ltr	1,3	1,3	1,1	1,1
Weight	kg	23	23	25	25
Connection inlet	ISO	25 KF	25 KF	25 KF	25 KF
exhaust	ISO	25 KF	25 KF	25 KF	25 KF

Technical Data		EVD-24		EVD-36	
		50 Hz	60 Hz	50 Hz	60 Hz
Nominal displacement	m^3/h	21,6	26	32,5	39
Ultimate partial pressure	mbar	10^{-4}	10^{-4}	10^{-4}	10^{-4}
Ultimate total pressure	mbar	$4 \cdot 10^{-3}$	$4 \cdot 10^{-3}$	$4 \cdot 10^{-3}$	$4 \cdot 10^{-3}$
Water vapour tolerance	mbar	33	33	33	33
Motor power	kW	0,75	0,75	0,75	0,75
Nominal speed	rpm	1450	1750	1450	1750
Noise level	dB(A)	52	54	52	54
Oil capacity	ltr	1,4	1,4	1,8	1,8
Weight	kg	37	37	39	39
Connection inlet	ISO	25 KF	25 KF	25 KF	25 KF
exhaust	ISO	25 KF	25 KF	25 KF	25 KF

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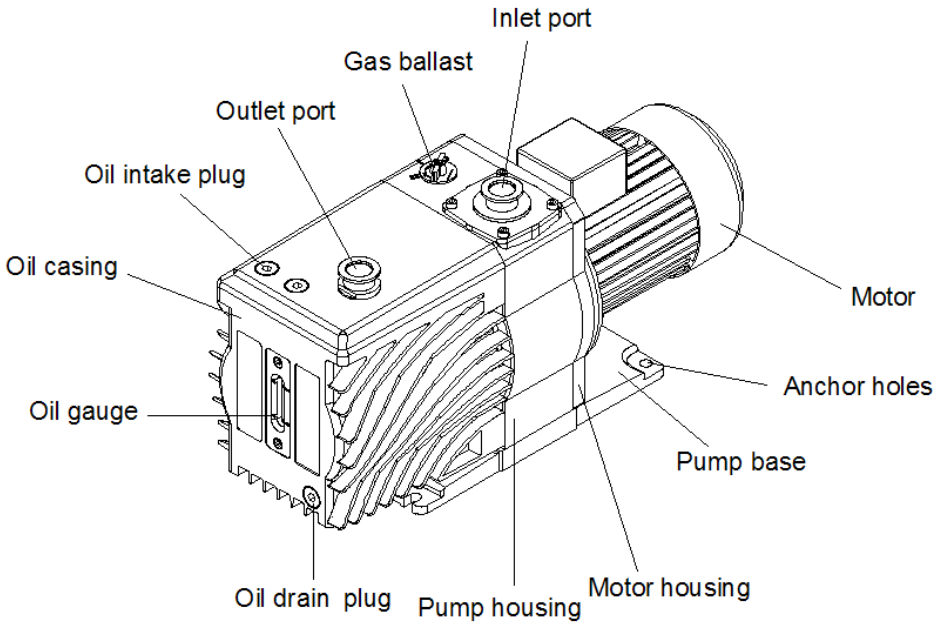
EVD-48, EVD-60, EVD-90

Technical Data		EVD-48		EVD-60		EVD-90	
		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Nominal displacement	m^3/h	50	60	65	78	90	105
Ultimate partial pressure	mbar	10^{-4}	10^{-4}	10^{-4}	10^{-4}	10^{-4}	10^{-4}
Ultimate total pressure	mbar	$4\cdot10^{-3}$	$4\cdot10^{-3}$	$4\cdot10^{-3}$	$4\cdot10^{-3}$	$4\cdot10^{-3}$	$4\cdot10^{-3}$
Water vapour tolerance	mbar	50	50	50	50	50	50
Motor power	kW	1,5	1,5	2,2	2,2	3,0	3,0
Nominal speed	rpm	1450	1450	1450	1450	1450	1450
Noise level	dB(A)	56	58	56	58	56	58
Oil capacity	ltr	3,8	3,8	5,5	5,5	6,5	6,5
Weight	kg	64	64	83	83	88	88
Connection inlet	ISO	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF
exhaust	ISO	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF

7. Installation

1) Unstable installation may lead to increased noise and damage to the pump. Therefore, it must be installed in a level place.
2) Location selection for the pump should consider the following:
   - Convenience for connection and operation;
   - Good ventilation;
   - Convenience for wiring.
3) Use the anchor holes of the pump when connecting it to a system.
4) The pump operating ambient temperature must be between +10℃ to +40℃.
5) A figuration drawing of the pump is given below.



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8. Vacuum System Connection

Use standard “quick release flanges” to link the pump’s air inlet to the vacuum system, and its air outlet to the exhaust duct.

1) Check the cleanness of the joint of duct and flange.
   - When polluted, the piping and flange could have a severe impact on performance of the pump. Therefore the joint should be kept clean as much as possible.
2) The length and diameter of the piping connecting the pump and vacuum system should be as short and big as possible, respectively.
3) Dimensions of the connecting vacuum lines shall be at least consistent with those of the air inlet and outlet.
   - If the diameter of the vacuum line is smaller than that of the pump’s air inlet, its pumping rate will decrease.
   - If the diameter of the exhaust is smaller than that of the pump’s air outlet, pressure in the oil tank of the pump will rise and make the degree of vacuum unstable.
4) Perform leak detection for the joint between piping and flange.

9. Wiring

1) Check and ensure that the power supply has been cut off prior to wiring.
2) Wiring should be performed by a professional electrician according to the label of motor.
3) Wiring should be conducted in accordance with rated values indicated on the trademark of motor.
4) It’s critical to ensure that the motor rotates correctly after it’s powered on.
5) Check the direction of rotation of the motor with the air inlet cover. Open the air inlet and outlet and place the cover on the air inlet. Power on for a test run for an instant, and at the same time, observe the air inlet cover which will be caught up when the motor is rotating correctly.

10. Inspection prior to Operation

1) The air outlet of pump must be clear. It’s strictly forbidden to start up the pump when the air outlet is blocked.
2) Check the amount of oil through the pointer of the oil tank.
3) Check the rotation direction of motor after wiring change.
4) In the case of oil change or restart the pump after a long periode, it should be started up with its air inlet covered so as to exhaust air in pump oil.

11. Operation

1) Without condensable gas
   - When the pump is used to eject permanent gas, the gas ballast control nut should point at the “Off” position.
2) With condensable gas
   - The air inlet of pump cannot be exposed to steam prior to its operating temperature.
   - If the pump operates at a lower temperature, steam may dissolve in the pump oil.
   - When steam dissolves in the pump oil, the oil should be change with regard to its performance and consequently may cause corrosion to the pump body. After the work is over, therefore: don’t stop the pump immediately, but block the air inlet and open the gas ballast valve, in order to allow the pump to continue operation till the steam is separated from pump oil.

- In continuous operation of the pump, condensable steam can be ejected from the subject system when the gas ballast valve is opened. When the pressure of the subject system decreases to a good level, close the gas ballast valve and then proceed with pumping.

3) Operating temperature of the pump

Between +40℃ to +80℃, So take care not to touch the pump with protection when it is hot.

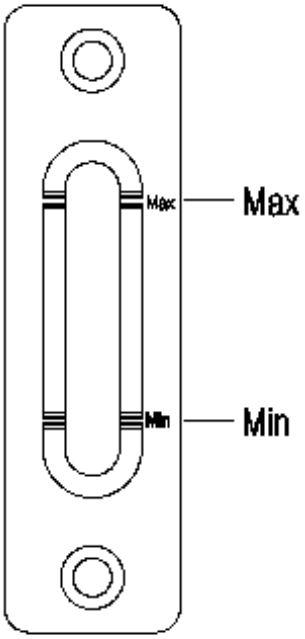
4) Pump stopping and storage

- The pump may be closed directly when an assignment is completed under normal conditions.
- When the pump will not be used for a long time, its air inlet and outlet should be sealed off to prevent dust and dirt from polluting the pump body.
- When the pump is not used for a long time, gases would adhere to the pump and its sealing elements. When it's used again, time for air extraction may be extended appropriately, and as long as the adsorbed is desorbed and removed, the pump can be restored to its normal operation.
- The pressure within the pump should be the same to the atmospheric pressure after stopping.

12. Maintenance

1) The power supply should be first cut off before the pump is removed from the vacuum system.
2) Check the oil level

- The level of pump oil should be within the corresponding interval of the pointer during operation.
- In the case of a low oil level, the pump should be stopped for the filling of oil.
- See the figure below.



3) Check oil quality
   - Visual inspection
     * Normal pump oil should be clean and transparent.
     * If the colour of oil darkens, change the oil.
     * The time between oil changes is subjected to the oil use conditions. Make inspection records and change oil on a periodical basis.
4) Oil change
   - To ensure the functions of the pump and its service life, be sure that oil is clean and there is always an appropriate amount of oil in the pump.
   - Reasons for oil changes.
     * If oil is contaminated, it's should be changed.
     * In initial use of a new pump, time for oil change may be shortened properly.
     * When the level of vacuum of the pump decreases with time, oil change is required.
   - Oil change method
     * When changing the oil, stop the pump and do the work in a warm environment.
     * Open the drain plug and let contaminated oil in the oil tank flow into a proper container.
     * To empty residual oil in the pump chamber, open the air inlet and make the pump run at most for 10 seconds.
     * Prior to the oil change, open the pump, inject clean oil from the air inlet to drain dirt out of the pump, and then place waste oil from the oil drain hole in a container.
     * Open the oil-fill plug, inject new oil, and then tighten the oil-fill plug.
   - Please use Eurovacuum high vacuum pump oil in order to ensure performance of the pump.
5) Clean the filter screen at the air inlet
   - The filter screen can prevent particles from entering the pump chamber.
   - To prevent decrease in pumping speed, it should be kept clean.
   - When cleaning the filter screen, separate the filter screen and the air inlet, place it in a container for cleaning, and then have it dried with compressed air before reinstallation for use.
   - If there's any damage to the filter screen you should change it.
   - Perform cleaning on a periodical basis, subject to use conditions.

13. Troubleshooting

Failure	Cause	Solution
Hard to start	1. High viscosity of the oil	1. Keep ambient temperature above 10℃, or change the oil
	2. Problem with motor voltage	2. Change the motor
	3. Error in wiring	3. Check and repair wiring
	4. Motor problem	4. Contact the supplier
Failure to arrive at limit pressure	1. The gas ballast valve is open	1. Close the gas ballast valve
	2. The admission pipe is attached to the air outlet	2. Connect the admission pipe to the air inlet correctly
	3. The admission pipe is too thin	3. Replace it by one with a larger diameter
	4. The diameter of the admission pipe is smaller than that of the air outlet	4. Replace it with a suitable one
	5. Air leakage in the vacuum system	5. Removal leakage points from the vacuum system
	6. Problem with oil return preventing device	6. Disassemble it for repair
	7. Error in use of oil	7. Employ Eurovacuum high vacuum pump oil
	8. Oil contaminated or inadequate amount of oil	8. Change or fill oil
	9. Oil-way blockage	9. Disassemble the pump for repair
	10. Damage to oil seal	10. Replace oil seal
	11. False installation of vane	11. Reinstallation
	12. Damage to exhaust valve plate	12. Replace exhaust valve plate
	13. Damage to vacuum gauge	13. Repair the vacuum gauge
Slow pumping speed	1. Too small diameter of air inlet and outlet or too long piping	1. Replace them with suitable air inlet and outlet piping
	2. Oil contaminated	2. Replace pump oil
	3. Damage to oil return preventing valve	3. Repair the valve
	4. Blockage of the inlet filter	4. Clean the inlet filter
	5. Error in use of oil	5. Employ Eurovacuum high vacuum pump oil
	6. Air leakage in the vacuum system	6. Repair air leaking component
	7. Too small pumping speed	7. Select a pump with appropriate pumping speed

Oil darkens and is turbid	1. Oil contaminated 2. Error in use of oil 3. Inadequate amount of oil in operation of the pump 4. Vacuum leakage	1. Change oil or purify it 2. Employ high vacuum pump fluid after cleaning the pump 3. Provide adequate oil 4. Remove the leaking points
Vacuum system returns to atmospheric immediately after stopping the pump	1. Air leakage in the vacuum system 2. Damage to the anti-suckback valve	1. Repair air leaking components 2. Repair the valve
Abnormal sound of operation	1. Damage to the coupling 2. Oil shortage 3. Pump oil used up, or damage to the oil pump 4. Damage to vanes 5. Problem with motor bearing	1. Replace the coupling 2. Add oil 3. Repair or replace the oil pump 4. Disassemble the pump and replace damaged vanes 5. Repair the motor
Abnormal consumption of oil	1. Damage to the O-ring of drain plug 2. False installation of or damage to oil seal 3. The oil seal sleeve damaged or corroded 4. Air leakage in the air inlet and outlet 5. Oil leakage from the gasket between the oil casing and pump housing	1. Replace the O-ring 2. Replace the oil seal, while giving attention to the direction of oil seal 3. Replace the oil seal sleeve 4. Replace O-rings 5. Replace the oil casing gasket
Vacuum system contaminated with oil	1. Steam flow back to the inside of the vacuum duct 2. Error in steam pressure of oil 3. Oil return in the case of pump stoppage 4. Damage to components of the back streaming preventing valve plate 5. Damage to or corrosion of the sealing components at the bottom of the air inlet	1. Change to use high vacuum pump fluid after cleaning the pump 2. Change to use high vacuum pump fluid after cleaning the pump 3. Check and repair the oil return preventing system 4. Change the valve plate 5. Replace sealing components of the air inlet

Too high pump temperature	1. Oil shortage 2. The air inlet duct attached to the air outlet 3. Blockage of oil supply pipe 4. Problem with oil pump 5. Ambient temperature above 40℃ 6. Too high temperature of the working gas	1. Add high vacuum pump fluid 2. Connect the air inlet duct to the air inlet correctly 3. Disassemble the pump, clean it, and change oil 4. Repair or change the oil pump 5. Decrease the ambient temperature 6. Change the work procedure
Smoke generation from the air outlet	1. Too much oil filled 2. The gas ballast valve opened 3. Air leakage in the vacuum system 4. Damage to exhaust valve plate of the pump	1. Reduce the amount of oil 2. Close the gas ballast valve 3. Remove leaking points of the vacuum system 4. Replace damaged valve plate

Note: 1. The Company will improve the product on a continual basis, its design and specification are subject to change without prior notice.
2. The right to final interpretation remains with Eurovacuum B.V.

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