

DIAPHRAGM VACUUM PUMP

User manual



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BEFORE USING, PLEASE READ THIS OPERATING MANUAL. Keep the manual for possible future use, as it may always be necessary to remember the information contained in the manual, and it must be provided with the device in the event of reselling the machine or changing the user.



WARNING! In order to avoid the risk of injuries and accidents, as well as to increase work efficiency and prevent premature failure of the device, read all warnings, safety instructions and paragraphs marked with the symbol: ⚠



Do not dispose of that product as unsorted municipal waste. Used equipment should be sent to an electro-waste collection point.



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All photos used in this manual are illustrative photos. The appearance and quantity of the elements supplied to the customer, as well as their mutual location may vary depending on the ordered vacuum piston pump.

This operating manual is based on current knowledge and experience. The manufacturer reserves the right to change the content of this manual without informing the consumer.

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1. Range of applications.

Vacuum pumps are used in the degassing of materials such as: silicone, resin, gypsum, and in the impregnation of wood and other porous materials. These pumps can be widely used in medical equipment, automotive industry, automation, printing machines, packaging machines, chemical industry.

The series of diaphragm vacuum pumps is characterized by oil-free technology, which allows them to work in clean rooms where the generation of oil mist is unacceptable. In addition, diaphragm pumps are equipped with filters to ensure the cleanliness of the exhaust air. They are characterized by stable operation, low noise level, high reliability and long service life. These advantages allow to use the diaphragm vacuum pumps to cooperate with specialized laboratory equipment, e.g. with the chromatogram apparatus, and as backing pumps for turbo molecular pumps.

VacuumChambers.eu declares that, the ultimate vacuum is below 200 mbar (20 kPa) or 50 mbar (5 kPa) of absolute pressure, depending on the pump model. The efficiency of diaphragm pumps is 20 l/min, 30 l/min or 60 l/min, depending on the pump model. Vacuum pump type DVPGM100A also can work as a compressor and allows to generate pressure of 2 bar relative pressure.

Vacuum diaphragm pumps available from VacuumChambers.eu are suitable for continuous operation. The internal cooling system allows the machine to continuously running for 24 hours.

Vacuum pump is operated in the following conditions: ambient temperature between +5°C and +40°C, air humidity up to 80 % at 20°C.

The vacuum pump is stored under the following conditions: ambient temperature from -15°C to + 50°C, air humidity up to 95 % without condensation of water vapour.

2. Properties of the diaphragm vacuum pump.

Diaphragm vacuum pump (Photo 1) consists of:

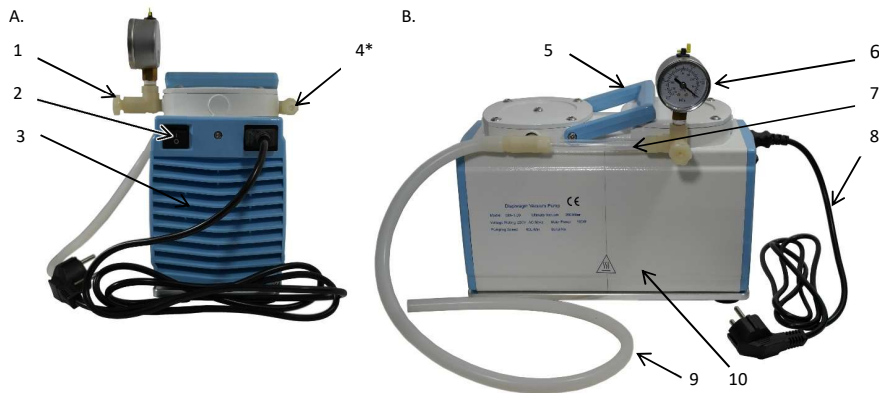


Photo 1: Diaphragm vacuum pump (A-side view, B – front view).

- | | |
|------------------------|-----------------------------|
| 1. Pressure regulator. | 7. Air intake pipe. |
| 2. Power switch. | 8. Power cord. |
| 3. Side cover. | 9. Silicone hose. |
| 4. Air exhaust pipe.* | 10. Pump housing. |
| 5. Handle. | |
| 6. Vacuum gauge. | *- occurs only in DVPGM100A |

On the housing (10) of the diaphragm vacuum pump there are: a handle (5) for easy carrying the device, a power switch (2) and two side covers (3) protecting the pump's moving parts. The pump has an air inlet pipe (7) with a fitting to which a flexible silicone hose (9) is attached. There is also a pressure regulator (1) and a vacuum gauge (6) on the air intake pipe. The vacuum gauge indicates the pressure in the air intake hose. Power cord (8) enables to connect the pump to the mains supply.

The vacuum pump type DVPGM100A is additionally equipped with an air exhaust pipe (4) with a fitting to which a silicone hose can be connected. In this configuration, the pump can work as an air compressor. The air intake and exhaust pipes and fittings look similar. The pipe on which the vacuum gauge is mounted is the air intake pipe-suction pipe.

Information about the pump type, selected parameters of the device and a warning about the possibility of heating the housing are placed on the pump housing.

Pumps available from VacuumChambers.eu are equipped with internal sealing made of NBR (nitril butadien rubber) or PTFE (teflon). Teflon sealing shows better resistance to aggressive chemicals than NBR sealing. Make sure that the sealing material is suitable to chemicals with which pump is to be used.

A. Pressure regulation.

The pressure regulator has a knob which enables pressure regulation. Obtaining vacuum with the value declared by the manufacturer requires the tightness of the system. However, when the absolute pressure generated by the device is too low for the intended process, the pressure regulator knob can be used to unseal the system. This will reduce the efficiency of the vacuum pump and increase the absolute value of generated pressure. The controller can be used in a situation when, for example: the pump has a declared ultimate vacuum value of 200 mbar (0.2 bar) absolute pressure, which corresponds to - 0.8 bar relative pressure, and the required for the process pressure is -0.5 bar relative pressure. The vacuum gauge indicates the current value of the pressure in the air intake pipe, which allows to control the pressure regulation process.

Turning the regulator knob anticlockwise unseal the vacuum system and decrease pump efficiency - the absolute pressure on the air intake pipe increases. Turning the regulator knob clockwise seals the vacuum system and increase pump efficiency- the absolute pressure on the air intake pipe decreases.

3. Before the first use.

Before using the diaphragm vacuum pump for the first time, remove it from its packaging and place it on an even flat surface. The package also includes a vacuum gauge, power cord and silicone hose. Photo 2 shows the diaphragm vacuum pump and the elements included in the package loosely. All loose elements should be installed on the pump by the customer in accordance with instructions below.

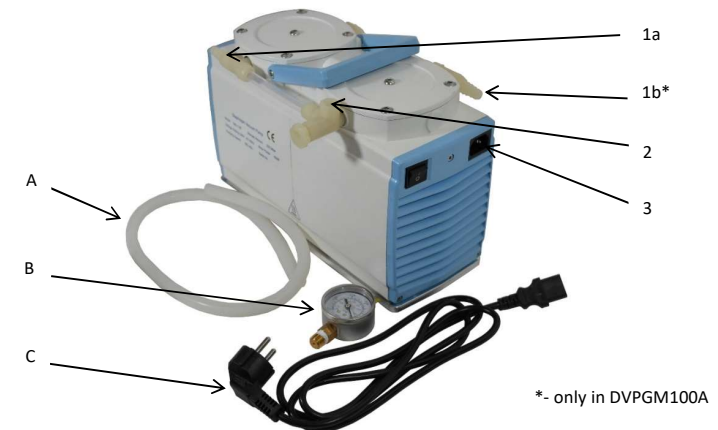


Photo 2: Diaphragm vacuum pump with items attached loosely.

The silicone hose (A) should be slipped over the air intake pipe fitting (1a). The hose is flexible and stretches during assembly, this provides good fit of the hose to the fitting, and ensures tightness of the connection. In the pump model DVPGM100A, the silicone hose can be attached to the air intake pipe fitting (1a) or to the air exhaust pipe fitting (1b). In the first configuration the pump can work as a vacuum pump, in the second configuration the pump can work as an air compressor. The silicone hose can only be connected to one of the fittings at a time. It is not possible to use the pump as a vacuum pump and compressor at the same time.

The vacuum gauge (B) should be mounted in the vertical threaded hole (2), above the air intake pipe. Screw the vacuum gauge into the hole by hand until feel resistance. The vacuum gauge should not be tightened too much, as this may damage the threaded hole. The vacuum gauge has sealing on the thread, to ensure tightness of the connection.

The power cord (C) should be inserted into the socket (3), next to the switch.

A. Vacuum gauge.

The vacuum gauge indicates the pressure in the air intake pipe. For this indication to be correct, it is necessary to unseal the vacuum gauge. To do this, set the yellow flag of the vacuum gauge (Photo 3), located on top of the gauge, in the open position. Turn the flag so that the arrow, visible on the flag, points towards the inscription "OPEN". Inscription is visible on the black rubber plug of the vacuum gauge. Photo 3 B. shows the yellow flag correctly positioned for work. Positioning the yellow flag in the other direction or toward the word "CLOSE" closes the vacuum gauge, which may result in inaccurate pressure indications.

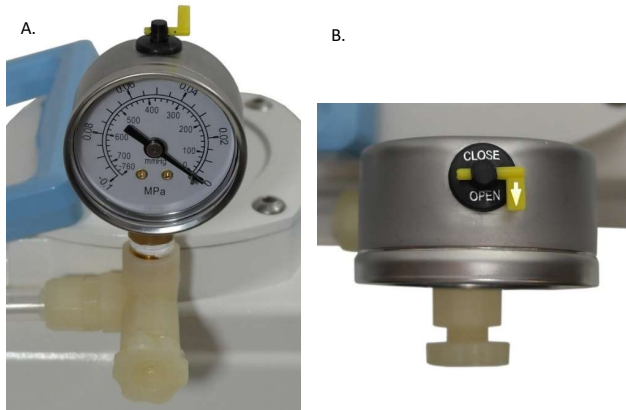


Photo 3: Vacuum gauge with yellow flag (A. – side view, B – correct setting of the yellow flag during operation).

4. Operating manual.

- 1) Connect the pump to the vacuum system or to the components it is to work with (the vacuum pump also can be started when no other components are connected to it).
- 2) Connect the pump's power cord to the mains supply.
- 3) Start the pump by turning the switch to the "ON" position.
- 4) Make sure that the yellow flag of the vacuum gauge plug is in the "OPEN" position (Photo 3 B.).
- 5) Check the pressure on the vacuum gauge.
- 6) If necessary, adjust the suction power of the pump using the pressure regulator knob.
Turn the pressure regulator knob anticlockwise to increase pressure in the air intake pipe (reduce pump suction power). Turn the pressure regulator knob clockwise to decrease the pressure in the air intake pipe (increases pump suction power). The pressure change is indicated by the vacuum gauge.
For the vacuum pump type DVPGM100A when working as a compressor: Turn the pressure regulator knob anticlockwise to reduce pressure in the air exhaust pipe (reduce air compression). Turn the pressure regulator knob clockwise to increase pressure in the air exhaust pipe (increases air compression).
- 7) After finishing work, turn of the pump by switching its switch to the „OFF" position.
- 8) If the device will not be used for a long time, disconnect the power cord from the mains supply.

5. Notes about use.

- The device should stand on its feet, on a horizontal and stable surface, in a dry, clean, low-dust and well-ventilated place. The distance of the side surfaces of the pump from other objects should not be less than 5cm. The distance between the front and back of the pump from other objects should not be less than 10 cm. If the pump will be installed inside any device or furniture, provide air inlet to the device from the pump side cover.
- The diaphragm vacuum pump is equipped with an internal cooling system. This allows the pump to run continuously for 24 hours.
- The pump works without oil. Do not fill the pump with oil nor lubricate it, as this may damage it.
- Do not connect to device a pipe with an inside diameter smaller than the fitting inside diameter.
- Do not allow corrosive gases or particulate material to enter the pump.
- If in the pumped gases may be present water vapour, oil contamination or other liquids, an additional filter should be used to prevent these contaminants from entering the pump.

- The rate of pressure drop during venting gradually decreases. However, if it is not possible to achieve a negative pressure at the level declared by the distributor, it may indicate the vacuum set leak.
- The efficiency of the device can be adversely affected at high altitudes, due to lower atmospheric pressure.
- If motor fails to start, or it slows down under load, turn it off and unplug it. Make sure that the pump parameters written on pump housing correspond to the power supply parameters.
- In the event of overheating or noisy work of the pump, stop the pump immediately and check the pump for malfunctions.
- Before perform any service or maintenance work, equalize the pressure inside the device with the ambient pressure. For example, by disconnecting a vacuum chamber from the pump.
- If the vacuum pump will not be used for a long period of time, cover the pump and then put it in a dry and safe place.
- To use vacuum pump type DVPGM100A as a compressor - connect the silicone hose to the pump exhaust pipe. This allows to compress blown out air and thus create a pressure. The vacuum gauge, supplied with the device, shows the pressure value on the air intake pipe. It does not indicate the pressure in the air exhaust pipe. The vacuum gauge is not suitable to indication pressure higher than 0 bar relative pressure. To indicate pressure generated by the pump it is necessary to install pressure gauge. The maximum pressure generated by pump type DVPGM100A is 2 bar relative pressure.

6. WARNING! Safety Instructions.



- Read the operating manual before use.
- There are warning decals on the vacuum pump. Read them before starting work and follow them.
- Before each use of the vacuum pump, it is necessary to check its technical condition, in particular the power cord of the vacuum pump.
- Perform servicing and maintenance of the vacuum pump periodically.
- Carry out all maintenance work when the pump is not hot and is not running.
- The general rules for the use of equipment working under voltage must be observed.
- To avoid risk of electrocution do not use this product in area where it could come in contact with water or other liquids.
- Before starting work, make sure that the parameters of the power source correspond to the pump requirements specified on the pump.
- Do not try to obtain higher pressure or vacuum than those recommended. Refer to the operating parameters given on the housing of the device.
- Before starting the pump, make sure that pump side covers are free from obstructions.
- Make sure that the pump complies with the technological requirements, processes and purposes for which it is to be used. Make sure that the pump is not exposed to chemicals that could damage it. The customer is solely responsible for selecting the appropriate pump for the working conditions.
- Do not pump flammable, explosive and toxic gases. Do not pump gases that are extremely moist or contain deposits or dust. If the pumped gases have a harmful effect on health or have a bad effect on the environment, an extension pipe can be installed at the pump exhaust (if possible). Handle the gases in accordance with environmental standards.
- The temperature of pumped gases should not be higher than +55°C.
- Use the pump in a safe, well-ventilated place, on a flat stable surface.
- Avoid excessive pollution of the working environment by dust, powders, small solids or water, as heavy contamination can damage the pump or cause its corrosion.
- Do not expose the device to rain or excessive moisture.
- Some parts of the vacuum pump can get very hot during operation. To prevent burns, never touch the pump housing during operation or immediately after switching it off.
- Never place in close proximity to the vacuum pump flammable, explosive, and susceptible to high temperature objects.
- In case of failure, immediately disconnect the device from the power supply.
- Do not repair the vacuum pump by yourself.
- Never put fingers or other objects inside the pump impeller cover. Keep your hair, clothing, gloves and other objects that could get into the impeller, away from moving parts.
- Do not subject any parts of the human body to vacuum or pressure.
- The device should be operated by trained technicians, mentally and physically able to operate the vacuum pump.
- Keep children and animals away from operating area of the device.
- Be foreseeable, watch what you are doing, and be reasonable when using the device. Do not use the device when you are tired or under the influence of drugs, alcohol or medication.



• Do not use the device or any of its parts for purposes other than those for which it was intended. Do not make any modifications or changes to pump or its individual components. Any modifications and changes are made by the customer under his sole responsibility and will void the warranty.

7. Maintenance.

Keep the vacuum pump clean. Disconnect the pump from the power supply before cleaning. Cleaning should be done at least once a month or more frequently if necessary.

Vent all vacuum or pressure from the product before cleaning. During maintenance work the pump should not be connected to elements being under vacuum or pressure.

Do not use petroleum-based components, acids, caustics, or flammable solvents to clean or lubricate any parts. Do not clean the pump with water jet. The pump housing should be cleaned with a damp cloth and mild detergent. Remember that the pump must be dry before use. If any dirt gets into the housing, it can be removed with compressed air.

The silicone hose can be washed with water and mild detergent. If necessary, replace it with a new one. Remember that the new hose must have an internal diameter not smaller than the internal diameter of the fitting mounted on the air intake pipe.

Make sure that during operation no water, moisture or other liquids enter the pump interior as they may corrode the elements inside the pump.

A. Cleaning and replacing the air intake filter.

The diaphragm vacuum pump is equipped with an intake air filter. Filter should be cleaned regularly as contamination may adversely affect the efficiency of the device or damage it. User is obliged to control the filter condition, regular cleaning or replacing it with a new one, if necessary. The intake air filter is located inside the housing, under the cylinder cover, located on the top side of the device (Photo 4).



Photo 4: Diaphragm vacuum pump – top view.

To start replacing or cleaning the air filter remove the cylinder cover, which is attached to the device with screws. Remove screws using a size 4 Allen key. Then remove the cylinder cover by gently lifting it up. After removing the cylinder cover, a white sealing plate is visible (Photo 5). Gently take it out and check its condition. If there are visible signs of wear or damage, replace it with a new one. If dirty the plate can be cleaned with a soft dry cloth.

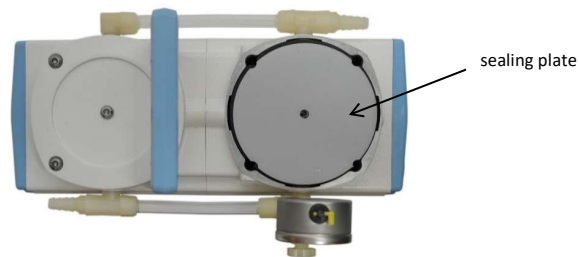


Photo 5: Diaphragm vacuum pump - without head cover.

After removing the sealing plate, the black air filter located in the pocket is visible. Check the condition of the filter and, if necessary, remove it and clean or replace it with a new one.

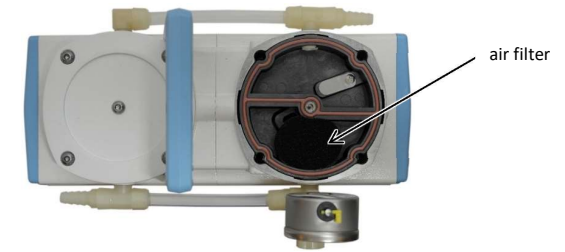


Photo 6: Diaphragm vacuum pump – air filter.

Make sure that the inserted filter is clean and completely dry. Installation of a damp air filter may result in corrosion of the components inside the device. Failures and damage resulting from using the pump with a dirty or moist air filter are not covered by the warranty.

When the condition of the filter allows its operation, it should be placed in the device where it was previously located. It should lie flat in the pocket. Its sides should adjoin the device locally. The filter is slightly deformed during installation. Particular attention should be paid to whether the filter covers the hole with which the air intake pipe is connected.

Place the sealing plate in the centre of the cylinder housing, make sure that the hole and cuts in the plate are above the holes in the pump housing. Then place the head cover on top of the sealing plate. The holes in the head cover should correspond to the holes and cuts in the sealing plate. Reassemble all the screws using an Allen wrench, tighten them until feel resistance.

8. Warranty.

VacuumChambers.eu guarantees that the vacuum pump will be operational and free of defects for a period of 12 months from the date of purchase. In the event of a breakdown during this period, VacuumChambers.eu will repair or replace any damaged pump element on the terms described in the warranty card included with the pump.

This limited warranty does not cover damage to the pump caused by improper use, maintenance or use not in accordance with this manual. Any use of the device, which is not in accordance with the intended purpose given above is forbidden and will void the warranty and the manufacturer's liability for any resulting damage. Any modifications of the device made by the user release the manufacturer from liability for damage and damage caused to the user and the environment. Proper use of the device also applies to maintenance, storage, transport and repair.

VacuumChambers.eu is not liable for damages, nor does it cover them under the warranty, for any kind of losses resulting from the breakdown of this product. In the case of a claim, VacuumChambers.eu's sole responsibility is to accept a return or exchange of the product itself.