Atlas Copco

Oil-sealed rotary vane vacuum pumps

GVS 16A, GVS 25A, GVS 40A, GVS 60A, GVS 100A, GVS 200A, GVS 300A, GVS 470A, GVS 630A

Instruction Book
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Issue B
Atlas Copco
Oil-sealed rotary vane vacuum pumps

GVS 16A, GVS 25A, GVS 40A, GVS 60A, GVS 100A,
GVS 200A, GVS 300A, GVS 470A, GVS 630A

Instruction book
Original instructions

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This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.
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1. Safety precautions

1.1 Safety icons

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1.2 General precautions

1. The operator must employ safe working practices and observe all related work safety requirements and regulations.

2. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.

3. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel.

4. The vacuum pump is designed for handling atmospheric air only. No other gases, vapours or fumes should be exposed to the vacuum pump intake or processed by the vacuum pump.

5. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the vacuum pump, press the emergency stop button, switch off the voltage and make sure that the pump system is at atmospheric pressure level. In addition, the power isolating switch must be opened and locked.

6. If the machine is equipped with an automatic restart after voltage failure function and if this function is active, be aware that the machine will restart automatically when the power is restored if it was running when the power was interrupted!

7. Avoid contact with pump intake during operation.

8. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.

8. It is not allowed to walk or stand on the unit or on its components.

1.3 Safety precautions during installation

All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.
Precautions during installation

1. The machine must only be lifted using suitable equipment in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment.

2. The unit is designed for indoor use. If the unit is installed outdoors, special precautions must be taken; consult your supplier.

3. Place the machine where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Water handling capacity is limited.

4. Any blanking flanges, plugs, caps and desiccant bags must be removed before connecting the pipes.

5. Air hoses must be of correct size and suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and suitable for the working pressure.

6. The aspirated air must be free of flammable fumes, vapours and particles, e.g. paint solvents that can lead to internal fire or explosion.

7. Arrange the air intake so that loose clothing worn by people cannot be sucked in.

8. No external force may be exerted on the inlet and outlet connections; the connected pipes must be free of strain.

9. If remote control is installed, the machine must bear a clear sign stating: DANGER: This machine is remotely controlled and may start without warning. The operator has to make sure that the machine is stopped, depressurized and that the electrical isolating switch is open, locked and labelled with a temporary warning before any maintenance or repair. As a further safeguard, persons switching remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.

10. Air-cooled machines must be installed in such a way that an adequate flow of cooling air is available and that the exhausted air does not recirculate to the inlet.

11. The electrical connections must correspond to the applicable codes. The machines must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the pump.

12. On machines with automatic start/stop system or if the automatic restart function after voltage failure is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.

13. In multiple vacuum pump systems, manual valves must be installed to isolate each pump. Non-return valves (check valves) must not be relied upon for isolating multiple systems.

14. Never remove or tamper with the safety devices, guards or insulation fitted on the machine.

15. Piping or other parts with a temperature in excess of 70˚C (158˚F) and which may be accidentally touched by personnel in normal operation must be guarded or insulated. Other high temperature piping must be clearly marked.

16. For water-cooled machines, the cooling water system installed outside the machine has to be protected by a safety device with set pressure according to the maximum cooling water inlet pressure.

17. If the ground is not level or can be subject to variable inclination, consult the manufacturer.

18. Pump outlet air contains traces of oil mist. Ensure compatibility with the working environment.

19. Whenever air containing hazardous substances is sucked in (i.e. biological or microbiological agents), use abatement systems placed upstream of the vacuum pump.

20. Any vacuum pump placed in an application with inlet gas stream temperatures above the published maximum temperature should be approved by Atlas Copco prior to start-up.
Also consult sections Safety precautions during operation and Safety precautions during maintenance or repair. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during operation

All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

Precautions during operation

1. Never touch any piping or components of the vacuum pump during operation.
2. Use only the correct type and size of hose end fittings and connections. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapours or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door. On vacuum pumps without bodywork, wear ear protection in the vicinity of the machine.
7. People staying in environments or rooms where the sound pressure level reaches or exceeds 80 dB(A) shall wear ear protectors.
8. Periodically check that:
   - All guards are in place and securely fastened
   - All hoses and/or pipes inside the machine are in good condition, secure and not rubbing
   - There are no leaks
   - All fasteners are tight
   - All electrical leads are secure and in good order
   - Safety valves and other pressure relief devices are not obstructed by dirt or paint
   - Air outlet valve and air net, i.e. pipes, couplings, manifolds, valves, hoses, etc. are in good repair, free of wear or abuse
   - Electrical cabinet air cooling filters are not clogged
9. If warm cooling air from vacuum pumps is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.
10. On water-cooled vacuum pumps using open circuit cooling towers, protective measures must be taken to avoid the growth of harmful bacteria such as Legionella pneumophila bacteria.
11. Do not remove any of, or tamper with, the sound-damping material.
12. Never remove or tamper with the safety devices, guards or insulations fitted on the machine.
13. The oil separator tank can be slightly pressurised. Do not open and do not leave oil filler or drain plugs open during operation.
14. Do not use the pump as a compressor.
15. Never run the pump without the air intake filter mounted.

Also consult sections Safety precautions during installation and Safety precautions during maintenance or repair. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.5 Safety precautions during maintenance or repair

All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during maintenance or repair

1. Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine spare parts.
4. All maintenance work shall only be undertaken when the machine has cooled down.
5. A warning sign bearing a legend such as "Work in progress; do not start" shall be attached to the starting equipment.
6. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
7. Before removing any component, effectively isolate the machine from all sources of under- and/or overpressure and make sure that the pump system is at atmospheric pressure level.
8. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.
9. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
10. Never weld or perform any operation involving heat near the oil system. Oil tanks must be completely purged, e.g. by steam cleaning, before carrying out such operations. Never weld on, or in any way modify, pressure vessels.
11. Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapour when air is admitted.
12. Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
13. Make sure that no tools, loose parts or rags are left in or on the machine.
14. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
15. Before clearing the machine for use after maintenance or overhaul, check that operating pressures,
temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly. If removed, check that the coupling guard of the vacuum pump drive shaft has been reinstalled.

16. Every time the separator element is renewed, examine the discharge and the inside of the oil separator vessel for carbon deposits; if excessive, the deposits should be removed.

17. Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam cleaning.

18. Make sure that all sound damping material and vibration dampers, e.g. damping material on the bodywork and in the air inlet and outlet systems of the vacuum pump are in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.

19. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.

20. Faults or wearing of seals may cause oil lubricant leaks. Avoid dispersion in soil and pollution of other materials.

Also consult sections Safety precautions during installation and Safety precautions during operation.

These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

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2. General description

2.1 What is vacuum and how is flow rate understood

What is vacuum and how to denote
A vacuum is any pressure in a system that is below the ambient atmospheric pressure. It can be denoted in absolute terms or in effective (gauge) terms:

- mbar(a) – absolute pressure – denotes how much the pressure is above absolute zero vacuum.
- (minus) mbar(e) – the effective or gauge pressure – denotes how much the pressure is below the local atmospheric pressure.

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<thead>
<tr>
<th>Reference</th>
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<tbody>
<tr>
<td>1</td>
<td>Pressure</td>
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<tr>
<td>2</td>
<td>Absolute vacuum</td>
</tr>
<tr>
<td>3</td>
<td>Typical application working range</td>
</tr>
<tr>
<td>4</td>
<td>Atmospheric pressure</td>
</tr>
</tbody>
</table>

- Atmospheric pressure at sea level is roughly 1 bar(a) or 1000 mbar(a) or 0 bar(e). The typical working range for pump applications is 400 mbar(a) to 100 mbar(a), i.e. -600 mbar(e) to -900 mbar(e). This operating pressure range is just indicative. The GVS A vacuum pumps are designed for continuous operation between atmospheric pressure and their ultimate pressure.
- It is important to understand which type of reference is required before selecting a pressure instrument for measuring the vacuum.
- It must be noted that the distinction doesn’t matter for a pressure difference (e.g. pressure loss), since it is always the result of subtracting 2 pressures (whether stated as absolute or as effective pressures).
Flow rate definitions

There are 2 common but different ways to denote flow rate in vacuum. The first one is based on the displacement or volumetric flow rate and the second one is based on the throughput or mass flow rate. Atlas Copco vacuum pumps use volumetric flow rate to denote performance, the unit being actual m³/h.

Displacement/volumetric flow rate

Over the relevant pressure range, a GVS A pump operates at constant motor speed (rotations per minute) and since the compression chambers have fixed dimensions, the same volume of air is pumped from inlet to outlet with falling pressure level. Over the relevant pressure range, this makes the volumetric flow rate practically independent of the vacuum level. It is the expression of the flow rate inside the piping at the governing vacuum level (in actual m³/h) and is always higher than the standard flow rate (in Nm³/h).

Standard flow rate

Although the volumetric flow rate remains practically constant with decreasing (absolute) pressure, the number of molecules in that pumped volume is not. By definition: the deeper the vacuum, the lower the amount of molecules in the same volume. This means that the mass flow will decrease with decreasing (absolute) pressure. It is clear that a flow rate must be stated at a certain vacuum level when using this denotation.
2.2 General description

The GVS 16A up to GVS 630A are single-stage, oil-sealed and air-cooled rotary vane vacuum pumps driven by an electric motor. GVS 100A up to GVS 300A are also available without electric motor. GVS 470A and GVS 630A are belt driven.

The pumps have been specifically designed to work with clean air, inert gas or small amounts of water vapour. The ambient temperature shall be between 12 °C and 40 °C.

For applications with high oxygen concentration, O₂ - versions are available (GVS 60A up to GVS 630A)

Note: lower temperatures are possible with reduced viscosity oil. This temperature range is defined by Pneurop for performance conformity testing, but 8 °C is the critical point from the motor starting view point.

| 1 | Air intake |
| 2 | Air outlet |
| 3 | Rotary vane element housing |
| 4 | Motor |
| 5 | Exhaust filter element housing |
2.3 Air flow

- Air drawn through the air intake filter (optional), the inlet protection screen and the inlet non-return valve is displaced by the vacuum pump element towards the air end exhaust valve. This valve ejects a mixture of air and oil into the exhaust filter element. After passing the exhaust filter element, clean air - conditioned to a few parts per million - is discharged through the outlet.

- The vacuum pump is driven by an electric motor.

![Diagram of GVS 16 – 25A](image1)

![Diagram of GVS 40-300A](image2)

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<td>1</td>
<td>Inlet non-return valve</td>
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<tr>
<td>2</td>
<td>Vane (vacuum pump element)</td>
</tr>
<tr>
<td>3</td>
<td>Exhaust valve</td>
</tr>
<tr>
<td>4</td>
<td>Oil recovery valve</td>
</tr>
<tr>
<td>5</td>
<td>Exhaust filter element</td>
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Flow diagram, GVS 16A and GVS 25A
Flow diagram, GVS 40A and GVS 60A
Flow diagram, GVS 100A and GVS 300A
Flow diagram, GVS 200A
Flow diagram, GVS 470A and GVS 630A
2.4 Oil flow

Oil injected into the pump chamber serves to seal, lubricate and cool the pump. The oil entrained with the compressed gas is coarsely trapped in the bottom part of the oil casing. Then fine filtering occurs in the integrated exhaust filter elements. The proportion of oil in the exhaust gas is thus reduced below the visibility threshold (over 99 % entrapment rate). The oil trapped in the exhaust filters is returned to the generator via an oil return line. To prevent gas flowing at atmospheric pressure from the oil reservoir into the intake port, the oil return line is controlled by a float valve. The oil cycle is maintained by the pressure difference existing between the oil casing (pressure above atmospheric pressure) and the intake port (pressure below atmospheric pressure).
3. Installation

3.1 Dimension drawings

Dimension drawing GVS 16A and GVS 25A
Dimension drawing GVS 100A
Dimension drawing GVS 300A
Dimension drawing GVS 630A
3.2 Installation proposal

Installation proposal GVS 16A and 25A
Installation proposal GVS 40A
Installation proposal GVS 60A
Installation proposal GVS 200A
Installation proposal GVS 470A
Note 1:
Dimensions I and F depend on the motor selected.

Installation proposal GVS 630A

INLET FLANGE
EUROPE/WORLD - DN100 ISO K - DN100 PN10
NEMA - DN100 ISO K - ASA150 4"
Installation guidelines

- The following list must be used as a guide for the installation of GVS vacuum pumps. The list is not exhaustive. Every vacuum pump installation is unique and care must be exercised in the placement of each pump. If you are unsure of any installation variable, please consult Atlas Copco.

- Install the pump on a solid, level surface, suitable for taking its weight. Respect the minimal distance between the pump and the walls (see drawing).

- Correct process lines sizes have to be used to prevent restrictions and resulting pressure drops. As a rule of thumb, the inlet diameter of the pump should be maintained as far into the process as possible. Consult Atlas Copco for piping recommendations.

- The required ventilation capacity to limit the vacuum pump room temperature can be calculated from
  \[ Q_v = 0.2 \frac{N}{\Delta t} \]
  where
  - \( Q_v \) = required ventilation capacity in m\(^3\)/s
  - \( N \) = shaft input of the vacuum pump in kW.
  - \( \Delta t \) = temperature increase of the incoming ventilation air in the vacuum pump room in °C

- Make sure all piping connections from the pump to the point of use are leak tight and secure. Leaks add load to the vacuum pump. They decrease the available pump capacity and spoil the attainable ultimate pressure. All welds must be vacuum compatible.

- Vacuum rated isolation valves must be used. Compressed air valves and vacuum valves differ in their sealing characteristics and compressed air valves may leak in vacuum applications.

- All piping should be as straight as possible with non-restrictive diameters. Elbows, bends, tees and tapers should be used only when absolutely necessary.

- Keep plumbing and system free of fluids, water, dirt, and debris that are not part of the process. These can cause obstructions in the vacuum flow through the piping and can reduce available pumping capacity.

- Exhaust piping should be installed in such a manner that it does not create additional back pressure on the vacuum pump. Also, the exhaust piping should be installed sloping away from the vacuum pump.

- A recommended alternative is the use of a drip leg with drain point provision, to prevent condensate from running back into the fluid reservoir.

- Take extreme care in selecting the proper inlet filtration system for the vacuum pump. Liquids, solids and abrasive powders must be prevented from entering the vacuum pump to prevent mechanical failure or reduced lifetime. Inlet filtration must be installed on every pump. The potential for particulate contamination in rough vacuum applications is significant. The particle micron retention of the filter element must be smaller than the smallest possible particle load. Also, the inlet filter should be mounted in such a way to prevent particles from falling into the inlet of the vacuum pump during cleaning or changing of the filter element.

- If there is a risk for liquids to be drawn into the vacuum system, a liquid separator should be used to separate these liquids from the incoming air. In applications where there is significant amount of liquid, consult Atlas Copco.

- Keep the vacuum pump room dry and free from contamination.

- Follow recommended lubricant change schedules in normal applications (air) and watch closely the condition and appearance of the fluid in chemical or harsh applications. Check the leak rate of the system by pumping down to the ultimate pressure and then valve off the vacuum pump. Monitor the pressure rise over a period of five or ten minutes and record this rate of rise for future reference. This value is a good tool to have if you believe there are pump or system problems. Compare new value with the original.

- When pumping condensable vapours and particulates, more frequent fluid changes are required to maintain pump life. Consult Atlas Copco about types and styles of filtration units.
Be sure there is no back pressure on the exhaust line of the vacuum pump. Vacuum pumps are not specifically designed to compress exhaust gas above atmospheric pressure. Significant back pressure can overheat the pump and cause motor overloading. Back pressure on the pump should not exceed 0.15 bar(e) under normal operating conditions.

Maintain system seals on a regular basis. Damaged O-rings and gaskets must be replaced immediately. All flange faces must be free of dirt, lubricant and scratches.

Do not use collapsible tubing to plumb the vacuum system. Any restrictions in line diameter caused by tube collapse will reduce available pumping capacity.

In multiple pump installations, check valves should be installed in the inlet piping. This will prevent fluid from being drawn from an 'off' unit into an operating unit. Check valves should be properly sized so as not to "chatter" during operation. Spring loaded, elastomer seated check valves are recommended. These should be mounted in a horizontal flow orientation. Using properly sized actuated valves is even a better solution. This generally results in a lower pressure drop when open and in a better sealing when closed.

Vacuum gauge ports and gauges should be installed in each leg of central vacuum piping. This provides a diagnostic tool for troubleshooting both the application and any pump related problems.

Make sure that no temperature sensitive parts (plastic, wood, cardboard, paper, electronics) will touch the surface of the vacuum pumps.

Ambient and inlet temperature may never exceed the limits of the pump's working range. Make sure the installation location is vented such that a sufficient cooling of the vacuum pump(s) is available.

Special recommendations for using oxygen prepared pumps, filled with PFPE fluid
At the customer's site, it must be taken care of the following points:

- Pump exhaust must be collected & gases handled according applicable regulations.
- Use of only genuine spares & consumables. Use only dedicated PFPE Service kits for oxygen pumps.
- Accessories retrofitted on oxygen pumps must be hydrocarbon degreased using an adapted solvent. Take all required precautions.
- Use of PFPE fluid provided by Atlas Copco only.
- Making sure that PFPE fluid level in the pump is correct before switching on.
- When changing the exhaust filters, the pump must be operated for half an hour with closed intake but open GB sucking ambient air or inert gas for wetting the exhaust filters with PFPE. In case no gas ballast is provided, let the pump run for 5 minutes at atmospheric pressure on ambient air or inert gas.

For the pumps using perfluoropolyether (PFPE) as lubricant and when handling PFPE observe the following:
During thermal decomposition at temperatures over 290 °c toxic and corrosive gases are released. This is not likely to happen in a GVS A pump. When handling PFPE keep it way from open fires. Do not smoke with PFPE on your fingers.
Touch the inner sections of the pumps only while wearing clean gloves, and use clean tools; do the necessary work in clean and dry rooms.
The grease of the bearings has to be changed once a year for an operating time higher than 5000 h per year or every 5000 hours for an operating time lower than 5000 h/year.
Clean the bearings before regreasing.
3.3 Motor installation (if applicable)

It is possible to install any type of electric or hydraulic motor of which the specifications comply to the technical data, with flange and shaft corresponding to:

- M112 – B14 (FT130) size as per standard IEC60072-1 (for Europe and Wide motor versions) and motor frame size 213 with 184 TCH flange for Nema motor version for GVS 100A
- M112 – B5 (FF215) size as per standard IEC60072-1 (for Europe and Wide motor versions) and motor frame size 213 TC for Nema motor version for GVS 200A
- M132 – B14 (FT215) size as per standard IEC60072-1 (for Europe and Wide motor versions) and motor frame size 256 TC with 215 TC flange for Nema motor version for GVS 300A

Motor installation instructions

- Remove the fixing clamp from the connecting joint on the pump.
- Fit the assembly on the motor shaft taking into account the stated measure.
- Tighten screw to firmly fix the assembly to the shaft.

\[ GVS\ 100A\ Motor\ coupling\ half\ position \]
Motor installation instructions for GVS200A

1. Place a suitable container underneath the pump to catch the oil spillage. Remove the drain plug. Drain the pump.

2. Remove the pump coupling housing, disconnect the finned oil cooler and unscrew the two connectors (1 on oil casing and 1 on tube) as explained in following steps:
a. Remove three screws securing coupling housing. Remove coupling housing.

b. Unscrew the oil cooler connector on casing.

c. Unscrew the oil cooler connector on tube.
3. Place motor in vertical orientation so that motor shaft facing upwards.

4. Ensure the turbine support on a 3mm thickness spacer.

5. Tighten the screw to 2 N.M torque. Apply LOCTITE 243.
6. In order to assemble motor and coupling housing on pump, follow step 2 in reverse order.

7. Cover the pump. Mount lifting bar on the pump.

8. Refit the drain plug. Pour recommended quantity of oil in the pump.

3.4 Electrical connections

- Always use a protection system, including an overcurrent protection and an electrical disconnecting device, between the pump and the electric power supply. Motor currents can be found on the motor data plate. The pump is normally delivered without electrical cable and without switch. For the electrical connection, check the diagram inside the terminal box or on the motor data plate.

- Additional safety devices are available as options including an oil pump temperature switch.
3.5 Pictographs

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<tbody>
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<td>1</td>
<td>Rotation direction of fan</td>
</tr>
<tr>
<td>2</td>
<td>Warning: voltage</td>
</tr>
<tr>
<td>3</td>
<td>Hot surface warning</td>
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</tbody>
</table>
4. Operating instructions

4.1 Initial start-up

Safety

⚠️ The operator must apply all relevant safety precautions. See section Safety precautions during operation.

Procedure

⚠️ The pump is supplied with oil inside (except for O₂ versions).

If the air intake filter (optional) is delivered loose, mount it in a leak-tight manner according to the following instructions:

- **GVS 16A and GVS 25A**
- **GVS 40A up to GVS 300A**
The air intake filter (optional) should be installed in a horizontal position to prevent filtered dust falling into the pump inlet when replacing the air intake filter element and resulting damage to the pump.

Initial start-up instructions:

- Check the process lines for the correct size to prevent high pressure drop and for cleanliness to protect the vacuum pump.
- Make sure the pump outlet is not obstructed.
- Check that the electrical connections correspond to the applicable codes and that all wires are clamped tight to their terminals. The installation must be earthed and protected against short circuits by fuses of the inert type in all phases. An isolating switch must be installed near the vacuum pump.
- Switch on the voltage and switch it off immediately. Check the rotation direction of drive motor while the motor is coasting to a stop. The correct rotation direction of the drive motor is indicated by an arrow shown on the motor fan cowl. If the rotation direction of the drive motor is incorrect, open the isolating switch and reverse two incoming electric lines. Incorrect rotation direction of the drive motor may cause damage to the vacuum pump.
- Start and run the vacuum pump for a few minutes. Check that the vacuum pump operates normally.

---

If you intend to apply the vacuum pump on humid applications, it is recommended that the unit is allowed to achieve optimal running temperature before it’s effectively put in operation. This can be done by running the unit against a closed suction line for 30 minutes with open gas ballast.

Gas ballast location and use is indicated on the pump dataplate.
4.2 Starting

Procedure:
- Check oil level and oil condition.
- Switch on the voltage.

To avoid excessive energy consumption and damage to the vacuum pump the maximum allowed starting frequency is 6 starts per hour.
For more frequent operation, let the pump run continuously and control the vacuum demand by a pitot valve on the pump inlet.

4.3 During operation

The operator must apply all relevant safety precautions. See section Safety precautions during operation.
Also consult section Problem solving.

Regularly check the oil level and the oil condition. The oil level should be in the middle of the oil sight glass.
See instructions in sections Preventive maintenance schedule and Oil and oil filter change.

4.4 Stopping

We recommend running the unit off-line for typically 30 minutes with closed inlet valve but open gas ballast prior to switching off. This will condition the oil ready for the next start-up. If the gas stream was heavily contaminated with water vapour, a longer period of running the unit off-line can only extend oil lifetime.
If the pump is stopped before all the condensed vapour has been disposed off, it will be deposited by gravity separation from the oil on the bottom of the oil after about 8 to 10 hours.
Before restarting, check for any water in the oil tank-leads to an increase of the oil level-through the oil viewer (high water handling capability versions only). If there is water, follow the instructions from paragraph 5.1.
In case of long machine downtime, check section Taking out of operation.

4.5 Taking out of operation

The operator must apply all relevant safety precautions. See section Safety precautions during operation.
Also consult section Problem solving.

Procedure
- Switch off the voltage and disconnect the vacuum pump from the mains.
- Drain the oil.
- Recycle the oil, oil filter and exhaust filter(s) in accordance with local environmental regulations for waste disposable and recycling.
5. Maintenance

5.1 Preventive maintenance schedule

Warning

Before carrying out any maintenance, repair work or adjustments, proceed as follows:

- Stop the vacuum pump.
- Switch off the voltage.
- Effectively isolate the machine from all sources of under- and/or overpressure and make sure that the pump system is at atmospheric pressure level.

For detailed instructions, see section Problem solving.
The operator must apply all relevant safety precautions. See section Safety precautions during maintenance or repair.

Warranty - Product Liability

Use only authorised parts. Any damage or malfunction caused by the use of unauthorised parts is not covered by Warranty or Product Liability.

Service kits

For overhauling or carrying out preventive maintenance, service kits are available (see section Service kits).

Service contracts

Atlas Copco offers several types of service contracts, relieving you of all preventive maintenance work. Consult your Atlas Copco Customer Centre.

General

When servicing, replace all removed O-rings and washers.

Intervals

The local Atlas Copco Customer Centre may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the vacuum pump.
The longer interval checks must also include the shorter interval checks.

Preventive maintenance schedule

<table>
<thead>
<tr>
<th>Operation</th>
<th>Normal</th>
<th>Medium</th>
<th>Harsh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check oil level &amp; condition.(See note below)</td>
<td>24 h</td>
<td>24 h</td>
<td>24 h</td>
</tr>
<tr>
<td>Clean dirt trap at pump inlet</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Monthly</td>
</tr>
<tr>
<td>Clean anti suck back valve at pump inlet.</td>
<td>Yearly</td>
<td>Yearly</td>
<td>Yearly</td>
</tr>
<tr>
<td>Change oil*, oil filter (if installed) &amp; exhaust filter</td>
<td>4000 h</td>
<td>2000 h</td>
<td>1000 h</td>
</tr>
<tr>
<td>Mineral oil</td>
<td>8000 h</td>
<td>4000 h</td>
<td>1000 h</td>
</tr>
<tr>
<td>Synthetic oil</td>
<td>8000 h</td>
<td>4000 h</td>
<td>4000 h</td>
</tr>
<tr>
<td>PFPE oil</td>
<td>8000 h</td>
<td>4000 h</td>
<td>4000 h</td>
</tr>
<tr>
<td>Clean the pump, the radiator and the motor fan guard</td>
<td>2000 h</td>
<td>1000 h</td>
<td>500 h</td>
</tr>
<tr>
<td>Check the vanes. Replace them, if needed</td>
<td>15000 h</td>
<td>10000 h</td>
<td>5000 h</td>
</tr>
<tr>
<td>Check belt condition (GVS 470– 630A)</td>
<td>Every 2000 h or 6 months</td>
<td>Every 2000 h or 6 months</td>
<td>Every 2000 h or 6 months</td>
</tr>
</tbody>
</table>
* : Just oil filtration in case of PFPE oil.
** : 4000 running hours or 1 year or whatever comes first.

<table>
<thead>
<tr>
<th>Important note:</th>
</tr>
</thead>
<tbody>
<tr>
<td>We recommend to monitor the oil condition through the sight glass and to change the oil when it becomes discolored or milky. Not changing oil in time can lead to premature blocking of the air exhaust filter and even failure of the vacuum pump.</td>
</tr>
<tr>
<td>Also check for condensed water vapour on the bottom of the oil tank through the oil viewer (high water handling capability versions only). If there is condensed water vapour, open the oil discharge valve slightly, let the condensed water vapour flow out and close it again as soon as oil starts to come out. Check the oil level and top up if necessary.</td>
</tr>
</tbody>
</table>

5.2 Oil specifications

It is strongly recommended to use only the genuine recommended lubricants. They are the result of years of field experience and research. See section Preventive maintenance schedule for the advised replacement intervals and consult your spare parts list for part number information.

<table>
<thead>
<tr>
<th>Triangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid mixing lubricants of different brands or types as they may not be compatible and the oil mix will have inferior properties.</td>
</tr>
<tr>
<td>Always drain the pump as good as possible. Used oil left in the pump shortens the lifetime of the new oil.</td>
</tr>
</tbody>
</table>

GVS A pumps are delivered with either synthetic or PFPE vacuum pump oil.

Recommended viscosity:
- GVS 16 – 25A : ISO VG 32
- GVS 40 – 630A :
  - Mineral oil : ISO VG 68
  - Synthetic / PFPE oil : ISO VG 100

5.3 Storage after installation

Procedure

In order to keep rubber parts and lip seals efficient and properly working, we recommend to operate the pump for at least 30 minutes every 6 months with the intake closed.

Store the pump in its packing in a covered, dry place at a temperature between -20°C (-4 °F) and 50°C (122 °F).

If the vacuum pump is going to be stored without running from time to time, protective measures must be taken. Consult Atlas Copco.
5.4 Service kits

Service kits

For overhauling and for preventive maintenance, a wide range of service kits is available. Service kits comprise all parts required for servicing the component and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low. Also a full range of extensively tested lubricants, suitable for your specific needs is available to keep the vacuum pump in excellent condition.

Consult the Spare Parts List for part numbers.

5.5 Disposal of used material

Used filters or any other used material (e.g. lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.
6. **Adjustments and servicing procedures**

6.1 **Drive motor**

Instructions

On GVS 100 – 630 A (GVS 16 – 60A don’t have motor bearings) the motor bearings must be changed every 20000h. Check recommendations on the motor supplier’s website. If installed remove the motor condensate drain plug yearly. Keep the motor free from dust for optimal cooling.

6.2 **Exhaust filter replacement**

**GVS 16A and GVS 25A**

- Remove the filter cover, by unscrewing the knob, together with the O-ring and the spring.
- Remove the filter with the O-ring.
- Clean the contact surface of the filter cover O-ring before reassembling the new parts.
- Fit the new O-ring in the new exhaust filter and insert them in their lodge.
- Fit the new O-ring in the filter cover and mount the spring on the filter end.
- Reassemble the parts, pushing on the filter cover while screwing by hand.

**GVS 40A, GVS 60A and GVS 100A**

- Unscrew the 4 or 6 screws of the filter cover and remove the filter cover together with the O-ring.
- Remove the exhaust filter(s) from the filter cover.
- Clean the exhaust filter O-ring lodge and the filter cover O-ring before reassembling the new parts.
- Install the new exhaust filter(s) following the instructions delivered with them.
- Reassemble the filter cover.

**GVS 200A**

- When the exhaust filter elements are clogged, the valves open and the filters are bypassed. Oil mist at the exhaust, and/or high oil consumption are signs that the exhaust filters are clogged.
- The exhaust filters must be replaced more frequently if subject to increased oil cracking products at high operating temperatures and/or aggressive media.
- Remove the exhaust flange with gasket. Unscrew the lock nut and remove spring between its both washers: take out the exhaust filter element(s).
- Take out the pressure relief valves and check that they move freely, and seal properly.
- Reassemble in the reverse sequence. Ensure that the exhaust filter elements are properly centered and positioned. Install spring between its both washers, and tighten stop nut, fully home with the 10 mm box wrench.

**GVS 300A**

- Remove the screws of the exhaust plate using a 8 mm Allen key.
- Lift the 3 exhaust filters from the W shaped metal sheet holder and remove them from the oil casing.
- Make sure that the new exhaust filters have the O-ring (opposite side of overpressure valve) and grease them using Atlas Copco vacuum grease.
- Replace the O-ring of the exhaust plate.
- Insert new exhaust filters. They are guided in the oil casing correct position. Make sure the compression springs are behind the W shaped metal sheet holder.
- Plug the exhaust plate on the W shaped metal sheet holder with the 2 location pins and screw the exhaust plate on the oil casing using a 8 mm Allen key.

GVS 470A

Tools required: Tubular box wrench 16 mm.
- When the exhaust filter elements are clogged, the integrated by-pass opens and the filters are bypassed. Oil mist at the exhaust, and/or high oil consumption are signs that the exhaust filters are clogged.
- The exhaust filters must be replaced more often if subjected to increased oil cracking products at high operating temperatures and/or aggressive media.
- Remove the cover with gasket. Remove the exhaust deflector by unscrewing the bolt.
- Remove both demister support units by unscrewing the nuts.
- The exhaust filters can be removed individually.
- Check also the float valve.
- Plug new exhaust filters into the oil casing.
- Insert carefully the demister support units over the new exhaust filters threaded bars (M6) and compress slightly the demister springs.
- Tighten the demister support units with the 4 nuts and the exhaust deflector. If necessary mount a new seal and mount the exhaust plate.

GVS 630A

Tools required: tubular box wrench 16 mm
- When the exhaust filter elements are clogged, the integrated by-pass opens and the filters are bypassed.
- Oil mist at the exhaust, and/or high oil consumption are signs that the exhaust filters are clogged.
- The exhaust filters must be replaced more often if subjected to increased oil cracking products at high operating temperatures and/or aggressive media.
- Remove the cover with gasket. Remove the exhaust deflector by unscrewing the bolt. Remove both demister support units by unscrewing the nuts.
- The exhaust filters can be removed individually. Check also the float valve.
- Plug new exhaust filters into the oil casing. Insert carefully the demister support units over the new exhaust filters threaded bars (M6) and compress slightly the demister springs.
- Tighten the demister support units and the exhaust deflector. If necessary mount a new seal and mount the cover.
6.3 Oil and oil filter change

Warning

Always apply all relevant safety precautions. See section Safety precautions during maintenance or repair.

Always drain the oil at all drain points. Used oil left in the pump can contaminate the oil system and can shorten the lifetime of the new oil.

Never mix lubricants of different brands or types as they may not be compatible and the oil mix will have inferior properties.

If the oil is replaced, replace the oil filter (if applicable) and exhaust filter(s) too.

Oil change procedure

- If the pump is cold run the pump with closed suction intake during about 10 minutes to warm up the oil.
- Stop the pump and disconnect it from the mains.
- Remove the oil filler plug.
- Open the oil drain valve and drain the oil completely into a container large enough to hold all oil and tilt the pump slightly (if possible).
- Close the oil drain valve and fill with new oil via the filler plug up to the middle of the oil sight glass. The oil level may not exceed the allowed maximum level!
- Close the oil filler plug.
- Wipe off eventual oil spills from the pump and/or the floor.
- Connect to mains again and verify correct rotation direction of the pump.
- Let the pump run with closed intake for a few minutes, stop the pump and check the oil level. Top up if necessary.

Oil filter change (not applicable to GVS 16A and GVS 25A)

- Drain the used oil completely following above instructions.
- Remove the oil filter.
- Apply a thin film of oil on the gasket of the new oil filter.
- Clean carefully the contact surface of the gasket on the tank and fit the new oil filter.
- Fill with new oil following above mentioned instructions.

Oil type change

- To prevent the oil dissolving residual oil sludge (and hence blocking channels), strictly follow the following procedure:
- Drain the used oil completely (tilt the pump slightly if possible).
- Clean the exhaust filter housing inside manually as good as possible (e.g. with clean dry cloth).
- Change the oil filter, but leave the existing exhaust filters inside the housing.
- Fill the pump with the correct amount of new synthetic oil.
- Run the pump for about 2 hours, then stop it. Drain the oil, clean inside as before and change the oil filter again.
- Refill with new oil and change the exhaust filters. Repeat this procedure until the oil remains clean (sight glass).
6.4 Cleaning radiator, motor fan guard and pump

Radiator, motor fan guard and pump must be kept clean. This can be done using compressed air and a dry cloth. Be careful not to damage the oil cooler (if applicable) by cleaning with compressed air or by exerting excessive pressure with the cloth.

Do not use fluids or substances other than those indicated.

6.5 Cleaning the intake filter (optional) element

1. Remove the intake filter element from the housing.
2. Clean the intake filter element in one of the following ways:
   - Hand washing:
     Soak and agitate element in a warm water and mild detergent solution. Allow adequate time for the element to air dry (24 hours minimum). Do not install a damp element. This will cause higher initial pressure loss and rapid dirt loading.
   - Compressed air cleaning:
     Using approximately 7 bar(e) (100 psi(g)), direct air flow at inside of element towards pleats. Blow off the outside of the element directing the air flow down to avoid embedding dirt in the media. Blow off the inside again to remove any dirt that might be on the clean side of the element.
   - Vacuum cleaning:
     Point the vacuum cleaner to the dirty side (outside of element) only, using a vacuum of approximately 100 mbar(a) (75 torr). A crevice tool is recommended.
   - Hand cleaning:
     Hold element down with one hand and move other hand across the fins in a strumming motion. This action will dislodge most of the dirt.
3. The element is ready to be reused.

6.6 Replacing V-belts

GVS 470A

Tools required: Key 19 and 24.

- In normal operating conditions, the belt has a lifetime of 30,000 hours. Wear characterizes by slip, abnormal wear or cracks. In case of wear, the correct alignment of the pulleys has to be checked. Tolerance ±1.3 mm.
- A dismounted belt has to be replaced with a new one.
- Take off the hood.
- Loosen the applicable nuts.
- Remove the belt.
- Reassemble in reverse sequence

See section 6.7 for V-belt tensioning.
GVS 630A

Tools required: Key 19 and 24.

- Take off the hood. Loosen the applicable nuts.
- Loosen the push rod.
- Remove the V belts.
- Reassemble in reverse sequence.
- Stretch the V-Belts with the V-belt tension meter.

See section 6.7 for V-belt tensioning.
6.7 V-belt tensioning

How to use the v-belt tension meter

- The tension meter is a tool designed to check and re-tighten the v-belts. It is made of two sliding pipes with a graded spring inside.
- Set the first o-ring at 10 mm (PIX) on the millimeter scale or 25 Inches of Span, as shown figure 8, picture 3, and the other o-ring on position 0 on the Newton scale.
- Install the tension meter as shown on picture 1 – figure 8, in the middle, half-way between the v-belt contacts point of the v-belts and the two pulleys.
- Push the Newton scale’s black rubber down in order to reach a 10 mm bending of the v-belt (pictures 2 and 4).

Check the result of your measurement. Tighten the belt tightener to reach the value given in table below

<table>
<thead>
<tr>
<th>Belt tension</th>
<th>Before run-in</th>
<th>Re-tightening (after 10 to 24 h)</th>
<th>Regular check (=6 months or 3000 h.) Value under which a re-tension is necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F (kg)</td>
<td>F (kg)</td>
<td>F (kg)</td>
</tr>
<tr>
<td>All pumps</td>
<td>5,0</td>
<td>4,5</td>
<td>3,5</td>
</tr>
</tbody>
</table>

Measure always on the same belt.

⚠️ Do no untighten a belt if the measurement is over the value in column (1). Do not change the V-belt tension.
## 7. Problem solving

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pump does not run (A)</td>
<td>No voltage</td>
<td>Provide power supply</td>
</tr>
<tr>
<td></td>
<td>Thermal switch has tripped</td>
<td>Identify cause and reset switch</td>
</tr>
<tr>
<td></td>
<td>Room temperature too low</td>
<td>Restore temperature to allowed value</td>
</tr>
<tr>
<td></td>
<td>Motor damaged</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td>The pump cannot reach stated vacuum (B)</td>
<td>Low oil level</td>
<td>To up oil</td>
</tr>
<tr>
<td></td>
<td>Oil contaminated</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>Pump gaskets damaged</td>
<td>Contact service department</td>
</tr>
<tr>
<td></td>
<td>Discharge clogged</td>
<td>Check couplings and outlet</td>
</tr>
<tr>
<td>Pump is noisy (C)</td>
<td>Exhaust filter element clogged</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>Bearings damaged</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td></td>
<td>Motor coupling damaged (if applicable)</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td></td>
<td>Vanes worn out</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td></td>
<td>Solid particles in the oil</td>
<td>Change oil</td>
</tr>
<tr>
<td>Pump runs hot (D)</td>
<td>Wrong oil type</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>Poor room ventilation</td>
<td>Install an auxiliary fan</td>
</tr>
<tr>
<td></td>
<td>Fan defect</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td></td>
<td>Wrong power supply to motor</td>
<td>Check</td>
</tr>
<tr>
<td></td>
<td>Discharge clogged</td>
<td>Check couplings at outlet</td>
</tr>
<tr>
<td>High oil consumption (E)</td>
<td>High working pressure (close to atmospheric pressure)</td>
<td>Check oil level frequently</td>
</tr>
<tr>
<td></td>
<td>Pump runs hot</td>
<td>See (D)</td>
</tr>
<tr>
<td></td>
<td>Exhaust filter element clogged</td>
<td>Replace</td>
</tr>
<tr>
<td>Pump does not maintain vacuum after power-off (F)</td>
<td>Check valve damage</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td>Pump leaks oil (G)</td>
<td>Tank screws or plugs loose</td>
<td>Tighten</td>
</tr>
<tr>
<td></td>
<td>Tank gaskets damaged</td>
<td>Contact Service Department</td>
</tr>
<tr>
<td></td>
<td>Oil sight glass loose</td>
<td>Tighten</td>
</tr>
<tr>
<td>The expected process vacuum level is not reached (H)</td>
<td>Too high pressure drop between process and pump inlet</td>
<td>Check the process lines for the correct size and leaks and correct if necessary.</td>
</tr>
<tr>
<td></td>
<td>Clogged air intake filter element.</td>
<td>Replace the filter</td>
</tr>
<tr>
<td></td>
<td>The pump cannot reach stated vacuum</td>
<td>See (B)</td>
</tr>
</tbody>
</table>
## 8. Technical data

### 8.1 Reference conditions and limitations

#### Reference conditions

<table>
<thead>
<tr>
<th></th>
<th>GVS 16A</th>
<th>GVS 25A</th>
<th>GVS 40A</th>
<th>GVS 60A</th>
<th>GVS 100A</th>
<th>GVS 200A</th>
<th>GVS 300A</th>
<th>GVS 470A</th>
<th>GVS 630A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient barometric pressure (mbar(a))</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
<td>1013</td>
</tr>
<tr>
<td>Ambient barometric pressure (Torr(mmHg))</td>
<td>760</td>
<td>760</td>
<td>760</td>
<td>760</td>
<td>760</td>
<td>760</td>
<td>760</td>
<td>760</td>
<td>760</td>
</tr>
<tr>
<td>Relative air humidity (%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Air inlet temperature °C</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Air inlet temperature °F</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Exhaust back pressure (mbar(e))</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Exhaust back pressure (psi(g))</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ambient temperature °C</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Ambient temperature °F</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Motor speed 50 Hz rpm</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Motor speed 60 Hz rpm</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
</tr>
<tr>
<td>Mineral oil viscosity 1ph ISO</td>
<td>VG32</td>
<td>VG32</td>
<td>VG32</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mineral oil viscosity 3ph ISO</td>
<td>VG32</td>
<td>VG32</td>
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## Limitations

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| Maximum inlet pressure for water vapour with standard gas ballast | torr (mm Hg) | 11.2    | 11.2    | 22.5    | 22.5     | 22.5     | 22.5     | 7.5      | 11       | 30
### Maximum Inlet Pressure for Water Vapour with Big Gas Ballast (or 2 GB)

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**Note:** Lower temperatures are possible with reduced viscosity oil. This temperature range is defined by Pneurop for performance conformity testing, but 8°C is the critical point from the motor starting viewpoint.
### 8.2 Pump data

All data are mentioned at reference conditions.

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<tr>
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= Without gas ballast
---

= With gas ballast
50 Hz

- GVS 60A
- GVS 100A
- GVS 200A

60 Hz

- GVS 60A
- GVS 100A
- GVS 200A

= Without gas ballast
= With gas ballast
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- **Without gas ballast**
- **With gas ballast**
## 8.3 Motor data

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</table>
9. Declaration of conformity

EU DECLARATION OF CONFORMITY

We, Atlas Copco Airpower n.v., declare under our sole responsibility, that the product

Machine name: VACUUM PUMP


Serial number: This declaration covers all product serial numbers from the date this Declaration was signed onwards.

Which falls under the provisions of article 12.2 of the EC Directive 2006/42/EC on the approximation of the laws of the Member States relating to machinery, is in conformity with the relevant Essential Health and Safety Requirements of this directive.

The machinery complies also with the requirements of the following directives and their amendments as indicated.

<table>
<thead>
<tr>
<th>Directive on the approximation of laws of the Member States relating to</th>
<th>Harmonized and/or Technical Standards used</th>
<th>Att’ mnt</th>
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<tr>
<td>b. Electromagnetic compatibility</td>
<td>EN 61000-6-2 : 2005</td>
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<td>EN 61000-6-4 : 2007/A1:2011</td>
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<td>c. Low voltage equipment</td>
<td>EN 60204-1 : 2006/A1:2009</td>
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<td>d. RoHS</td>
<td>EN 50581 : 2012</td>
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The harmonized and the technical standards used are identified in the attachments hereafter.

Atlas Copco Airpower n.v. is authorized to compile the technical file.

Conformity of the product to the specification and by implication to the directives

Issued by: Engineering

Name: Andries Desiron

Signature: [Signature]

Date: 30-02-2017

Place: Valence


1. **DIACHIARAZZIONE DI CONFORMITÀ UE**


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**HU**

1. **EU MEGFELELŐSÉGI NYILATKOZAT**


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**LV**

1. **ES ATTITIKTIES DEKLARĀCIJA**


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**LV**

1. **ES ATBILSTĪBAS DEKLARĀCIJA**


---

**MT**

1. **DIJKARAZZJONI TA’ KONFORMITÀ**

1. EU-VERKLARING VAN OVEREENSTEMMING


nl
1. EU-VERKLARING VAN OVEREENSTEMMING


pl
1. DEKLARACJA ZGODNOŚCI UE


pt
1. DECLARAÇÃO DE CONFORMIDADE UE


ro
1 DECLARAȚIE DE CONFORMITATE UE

Sustainable Productivity

We stand by our responsibilities towards our customers, towards the environment and the people around us. We make performance stand the test of time.

This is what we call - Sustainable Productivity