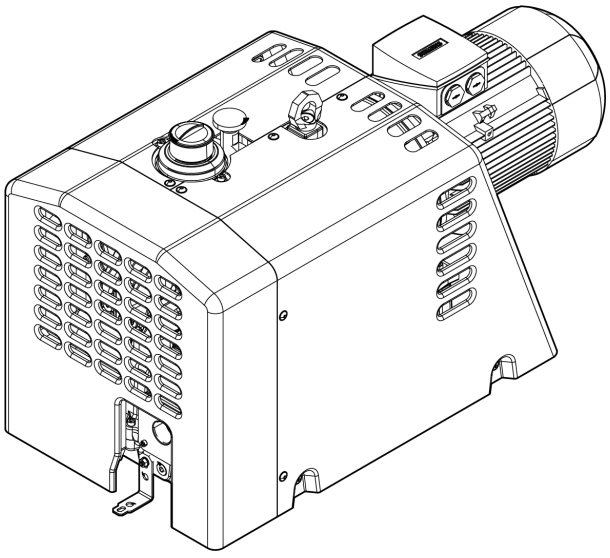
Leybold

Dry Claw Vacuum Pumps
CP 065B, CP 150B, CP 300B

Operating instructions 301007389_002_C1



Original instructions

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We accept no liability for loss of profit, loss of market or any other indirect or consequential loss whatsoever.

Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

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1 Safety and compliance

For safe operation from the start, read these instructions carefully before you install or commission the equipment and keep them safe for future use. Read all the safety instructions in this section and the rest of this manual carefully and make sure that you obey these instructions.

The instruction manual is an important safety document that we often deliver digitally. It is your responsibility to keep the instruction manual available and visible while working with the equipment. Please download the digital version of the instruction manual for use on your device or print it if a device will not be available.

1.1 Definition of Warnings and Cautions

Important safety information is highlighted as warning and caution instructions which are defined as follows. Different symbols are used according to the type of hazard.

WARNING:

If you do not obey a warning, there is a risk of injury or death.

CAUTION:

If you do not obey a caution, there is a risk of minor injury, damage to equipment, related equipment or process.

NOTICE:

Information about properties or instructions for an action which, if ignored, will cause damage to the equipment.

We reserve the right to change the design and the stated data. The illustrations are not binding.

Safety and compliance

1.2 Safety symbols

The safety symbols on the products show the areas where care and attention is necessary.

The safety symbols that we use on the product or in the product documentation have the following meanings:

	**Warning/Caution** Risk of injury and/or damage to equipment. An appropriate safety instruction must be followed or a potential hazard exists.
	**Warning - Automatic start up** Risk of injury. The equipment can be started remotely and without warning.
	**Warning - Heavy object** Risk of injury or damage to equipment. Identifies a possible hazard from a heavy object.
	**Warning - Hot surfaces** Risk of injury. Identifies a surface capable of inflicting burns through contact.
	**Warning - Maximum angle of paired slings** Risk of damage to equipment. Specifies a maximum angle that must be maintained to ensure safe lifting of equipment.
	**Warning - Moving parts present** Risk of injury. Identifies moving parts that may cause injury or damage to equipment.
	**Mandatory - Read the manual** Failure to comply with this action may result in injury or damage to equipment.
	**Warning - Use protective equipment** Risk of injury. Use appropriate Personal Protective Equipment (PPE) when performing the task.
	**Symbol – Waste Electrical & Electronic Equipment (WEEE)** The equipment must be discarded carefully. Obey local and national regulations for disposal of this equipment. Identifies compliant product supplied without a manufacturing date.

2 Important safety information

2.1 General safety precautions

WARNING: SLIPPING

Risk of slip/trip. Oil spills can make the floor slippery. Clean the floor with absorbent and/or degreasing products.

WARNING: HOT SURFACE

Risk of burns caused by contact with hot surfaces of the unit, which at start-up and in operation may reach high surface temperatures, as specified on the product nameplate. Handle the system only when it is ventilated and cooled down.

Open the drain or inlet connection for operating media only when the operating media temperature is close to ambient temperature.

WARNING: ELECTRICITY HAZARD

If connecting operations are carried out without removing the voltage from the electrical system or without setting up a system to avoid reinsertion, a direct contact of the operator with live parts can occur. This can also cause personal serious injury (or death).

Work on electrical equipment (installation and maintenance) must be done only by trained personnel, wearing PPE.

In the event of contact with a defective unit there is a risk of electrocution.

WARNING: TOXIC MATERIAL

Respiratory damage could occur due to gas leakage during operation and/or loosening of the connections to the gas flow circuits.

WARNING: AUTOMATIC RESTART

Risk of injury and damage to equipment. If the pump has an automatic restart function and it is set to on, the pump will restart automatically when the power is restored after the power interruption.

WARNING: RADIO INTERFERENCE

Risk of injury. In a domestic environment, the pump can cause radio interference which requires supplementary mitigation measures.

CAUTION: SAFETY PRECAUTIONS

Risk of loss of warranty. We will disclaim all responsibility for any damage or injury if you do not follow the safety precautions. You must follow all normal caution and care required for installation, operation, maintenance and repair, even if not stated in this manual.

Important safety information

- The operator must obey the work safety requirements and regulations.
- Make sure that you obey all the local site safety and operating procedures.
- If any of the statements does not agree with the applicable legislation, the stricter of the two is applicable.
- The installation, operation, maintenance and repair work must be done by authorised, trained and specialized personnel.
- The vacuum pump does not provide air of breathing quality. For breathing quality air, the compressed air must be purified as per the applicable legislation and standards.
- Before you do the maintenance, repair work, adjustment or other non-routine checks refer to Preventive maintenance schedule.
- For the pump that have a supply from the frequency converter, wait for 10 minutes before you start the electrical work.
- Do not rely on the indicator lamps or electrical door locks before you do the maintenance work. Always disconnect and check with a measuring device.
- Do not touch the pump intake when the pump is in operation.
- The pump must be kept in a safe operating condition. Replace parts and accessories that are not safe for operation.
- Do not walk or stand on the pump or on its components.
- Do not cause blockage to the outlet of the pump.
- Risk of slips or falls as a result of oil leakage. Check regularly for oil leaks and take precautions.
- Pump becomes hot during operation. danger of burns from touching hot surfaces, hot operating fluids or lubricants. Take care and wear suitable safety equipment.
- Hazards due to escape or emission of conveyed hazardous gases, vapors or substances. Conveyed process gases can escape from the exhaust and from leaks in the vacuum system. The conveyance of toxic / explosive / ignitable / pyrophoric / radioactive / oxidizing / corrosive gases or gas mixtures, as well as oxygen at concentrations above atmospheric (21 %) is fundamentally excluded. The operator is responsible for assessing the hazard potential of the process media and or mixtures.
- Failure or malfunction of the central control system (unexpected start-up) or hazards due to independent restart of a pump after a shutdown due to a fault. Crushing, cutting or cutting off by contact with moving parts due to restart command or voltage supply. Before carrying out maintenance or service work, disconnect the pump from the power supply, secure it against being switched on again, determine that it is not live, ground and short-circuit it and cover / isolate neighboring live parts.

2.2 Safety precautions during installation

CAUTION: INSTALLATION HAZARD

Risk of damage to system in case of incorrect connections. While installation first connect the inlet and outlet mechanically and then make the electrical connections. Make sure the inlet and outlet connections are correct before start-up.

CAUTION: INLET SIEVE

Risk of damage to pump. It is recommended to use inlet sieve to avoid suction of unwanted materials in the pump.

CAUTION: INSTALLATION SAFETY

Risk of damage to equipment. Obey the safety instructions and take note of all applicable precautions. Refer to *Safety precautions during operation* **on page 12** **and** *Safety precautions during maintenance or repair* **on page 14.**

Note:

These precautions are applicable to the pump that process or use air or inert gas. When the pump is used with other gases, it is necessary to use more safety precautions. Some precautions are general and might not apply to your pump.

1. When you lift the pump, make sure that:
   - you use the correct lifting equipment and you obey the local safety regulations.
   - you tighten all the loose and movable parts before you lift the pump.
   - no personnel are in the risk zone below the lifted load.
   - the speed of the lifting equipment is in the safety limits.
   - you wear a safety helmet in the areas of overhead or lifting equipment.
2. The pump is designed for indoor use. Contact us and take special precautions if you want to install the pump outside.
3. Install the pump in an area with cool and clean air. Do not cause blockage to the air inlet.
4. The water handling capacity of the pump is very less. For operating in such applications, consult us.
5. Remove the blanking flanges, plugs, caps and desiccant bags before you connect the pipes.
6. The vacuum connection and discharge pipes must be of correct size and applicable for the working pressures and temperatures. Do not use damaged or worn hoses.
7. The inlet air must have no flammable fumes, vapours or particles (for example, paint solvents can cause internal fire or explosions). Refer to the material safety guidelines.
8. Install the air inlet such that clothes worn by people do not get sucked in the air inlet.
9. Make sure that there is no external force on the inlet and outlet connection. Make sure that there is no strain on the pipe connections. Do not install supports to the external body (canopy) of the pump.
10. If remote control is installed, the machine must bear a clear sign stating:

    "DANGER: This machine is remotely controlled and can start without warning"

    Before any maintenance or repair, the operator must make sure that:
    - the pump is stopped
    - the isolation switch is open and locked

11. The operator for remote-control device must obey the necessary precautions and make sure that no one is working on the pump. Attach a suitable sign adjacent to the remote start equipment.
12. Air-cooled pump must be installed in such a way that the sufficient flow of the cooling air is available. Make sure that the exhausted air does not circulate again to the pump air inlet or cooling air inlet.
13. The electrical connections must be same as the applicable codes. Make sure that the pump is grounded and protected against short circuits by fuses in all phases. Install a power isolation switch near the pump. You must be able to lock the power isolation switch.
14. The pumps with an automatic start/stop system or an Automatic Restart After Voltage Failure (ARAVF) function must have the following warning sign attached near to the instrument panel.

    "This pump can start without warning"
15. In multiple pump systems, manual valves must be installed to isolate each pump. Do not relay on Non-return valves (check valves) for isolating multiple systems.
16. Do not remove or adjust the safety devices, guards or insulation installed on the pump.
17. There are pipes and the parts with temperature more than 70 °C (158 °F). Install insulation or guards to prevent contact with hot surfaces. All pipes and parts with high temperatures must be clearly marked.
18. If the ground is not flat or it has slope, contact the manufacturer.
19. When the air that has hazardous substances is sucked in (for example, biological or microbiological agents), use the abatement systems (installed upstream of the pump).
20. The pump installed in an application with inlet gas stream temperatures more than the maximum temperature must be approved by us before start-up.

2.3 Safety precautions during operation

WARNING: HIGH VACUUM HAZARD

Risk of injury or damage to pump. Do not start the system with open flanges, suction of unwanted materials at inlet will result in severe damage to the pump.

WARNING: HOT OPERATING FLUIDS

Risk of burns caused by contact with hot operating fluids. Avoid contact with operating fluid or lubricants during system operation.

CAUTION: PRESSURE AT SUCTION NOZZLE

Risk of damage to the pump. Make sure that the pressure at suction nozzle is less than the atmospheric pressure.

CAUTION: OPERATION SAFETY

Risk of injury or damage to equipment. Obey the safety instructions and take note of all applicable precautions. Refer to *Safety precautions during installation* **on page 10 and** *Safety precautions during maintenance or repair* **on page 14.**

Note:

These precautions are applicable to the pump that process or use air or inert gas. When the pump is used with other gases, it is necessary to use more safety precautions. Some precautions are general and might not apply to your pump.

1. Do not touch the pipes or components of the pump during operation. Do not get close to a running pump to avoid the risk of being sucked into the pump.
2. Use the correct type and size of hose end fittings and connections. Make sure that the hose is depressurised before you disconnect the hose.
3. The operator for remote-control device must obey the necessary precautions and make sure that no one is working on the pump. Attach a suitable sign adjacent to the remote start equipment.
4. Do not operate the pump:
   - near flammable or toxic fumes, particles or vapours as given in the principal data sheet.
   - outside the specified limit ratings.
5. Make sure that the external body (canopy) doors are closed during the operation of the pump. The doors can be opened for short periods (for example, routine service operation). Persons must wear ear protection when the doors are open. For the pump without an external body (canopy), ear protection must be worn near the pump.
6. If the pump is operated in a room where the sound pressure level is more than or equal to 80 dB(A), personnel must wear ear protectors.
7. At regular intervals make sure that:
   - the guards are correctly installed and are in the correct position
   - the hoses and pipes inside the pump are in good condition, secure and not rubbing
   - there are no leaks
   - the fasteners are tight
   - the electrical leads are secure and in good order
   - the inlet valve and the air net components (for example, pipes, couplings, manifolds and valves) are in good condition.
8. If warm cooling air from the pump is used in an air heating systems (for example, to warm-up a workroom) take necessary precautions for the air pollution and possible contamination of the breathing air.
9. Do not remove or adjust:
   - the sound-damping material
   - the safety devices
   - the guards
   - the insulation installed on the pump.
10. Do not change the purpose of the pump. If the pump is configured to be used as a vacuum pump, do not use the pump as an overpressure pump. If the pump has been configured to be used as an overpressure pump, do not use the pump as a vacuum pump

11. We recommend to install an air inlet filter for the safety of the pump. Contact us to check if the air inlet filter is necessary for the application for the pump.

2.4 Safety precautions during maintenance or repair

WARNING: MAINTENANCE SAFETY

Risk of injury or damage to equipment. Obey the safety instructions and take note of all applicable precautions. Refer to *Safety precautions during installation* on page 10 and *Safety precautions during operation* on page 12.

WARNING: HOT SURFACE

Risk of burns caused by contact with hot surfaces of the unit, which at start-up and in operation may reach high surface temperatures, as specified on the product nameplate. Handle the system only when it is ventilated and cooled down.

Open the drain or inlet connection for operating media only when the operating media temperature is close to ambient temperature.

Note:

These precautions are applicable to the pump that process or use air or inert gas. When the pump is used with other gases, it is necessary to use more safety precautions. Some precautions are general and might not apply to your pump.

1. Make sure that you use correct safety equipment (for example, safety glasses, gloves, safety shoes).
2. You must use correct tools for maintenance and repair work. Always use genuine spare parts.
3. Do not start the maintenance until the pump is cool.
4. Attach a warning sign of "Work in progress, do not start" adjacent to the pump before you start the maintenance or repair.
5. The operator for remote-control device must obey the necessary precautions and make sure that no one is working on the pump. Attach a suitable sign adjacent to the remote start equipment.
6. Before components are removed from the pump, make sure that :
   - the pump is isolated from all sources of under and overpressure
   - the pump is at atmospheric pressure.
7. Do not use flammable solvents or carbon tetrachloride to clean the parts. Obey the safety precautions for toxic vapours of cleaning liquids.
8. During the maintenance and repair:
   - clean the pump carefully
   - install the protective covers on the parts and openings of the pump.
9. Do not weld or do the operation involving heat near the oil system.
10. When there is an indication or suspicion that an internal part of a pump is overheated, stop the pump. Do not open the inspection covers until enough cooling time is completed to prevent the risk of spontaneous ignition of the oil vapour.
11. Do not use a light source with a flame to examine the inner side of the pump.
12. Make sure that no tools, parts or other items are left in or on the pump.

13. Be careful when you handle the regulating and safety devices. Make sure that they operate correctly. For safety, do not disconnect the regulating and safety devices.
14. Before you use the pump after maintenance or overhaul, make sure that:
    - the operating pressures, temperatures and time settings are correct
    - the control and shutdown devices are installed and they operate correctly
    - the coupling guard of the vacuum pump drive-shaft is installed.
15. Install protection for the motor, electrical and regulating components to prevent damage from moisture when the pump is cleaned (for example, steam cleaning).
16. Make sure that the sound-damping material and vibration dampers of the pump (for example, the sound-damping material on the external body (canopy)) is in good condition.Replace the damaged material with genuine material from the manufacturer to prevent the sound pressure level from increasing.
17. Do not use caustic solvents which can damage the materials of the air net, (for example, the polycarbonate bowls).
18. Faults or wearing of seals can cause leakage of oil lubricant. Prevent the dispersion in soil and pollution of the other materials.

3 General description

3.1 Vacuum and flow rate

A vacuum is a pressure in a system that is less than the ambient atmospheric pressure. It can be shown in absolute terms or in effective gauge terms:

- mbar(a) - the absolute pressure shows how much the pressure is above the absolute zero pressure (perfect vacuum).
- (minus) mbar(g) - the effective or gauge pressure shows how much the pressure is below the local atmospheric pressure.

Flow rate definitions

The two ways to show the flow rate in a vacuum are:

1. The displacement or volumetric flow rate (Am^3/hr)
2. Throughput or mass flow rate

Displacement/volumetric flow rate

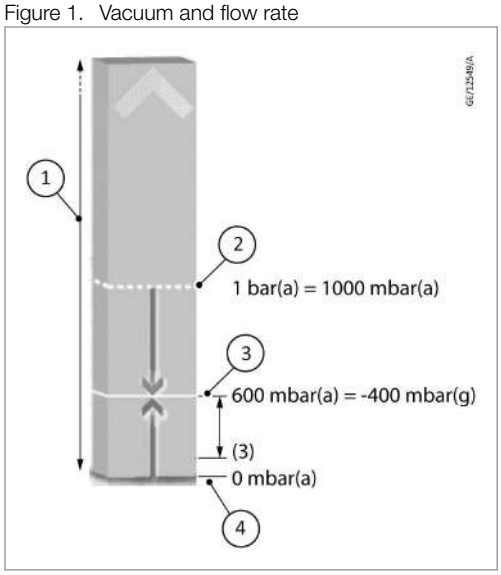
For the relevant pressure range, when the pump operates at quasi constant motor speed (rotations per minute) and since the compression chambers have fixed dimensions, the same volume of air is pumped from inlet to outlet with decrease in pressure level. Over the relevant pressure range, this makes the volumetric flow rate quasi independent of the vacuum level. It is the expression of the flow rate inside the piping at the governing vacuum level (Am^3/hr) and is always higher than the throughput or mass flow rate.

Throughput or mass flow rate

If the volumetric flow does not change with the decrease in pressure level, the number of molecules in the volume of air can change. The deeper the vacuum, the less number of molecules in the same volume of air.

The mass flow rate will decrease with a decrease in (absolute) pressure. A flow rate must be shown at a specified vacuum level when you use throughput or mass flow rate.

Figure 1. Vacuum and flow rate



1. *Pressure*
2. *Atmospheric pressure*
3. *Typical pump working range (600 mbar(a) (450 Torr(a)) - 150 mbar(a)) (112.5 Torr(a))*
4. *Absolute vacuum*

Atmospheric pressure at sea level is approximately 1 bar(a) or 1000 mbar(a) (750 Torr). The working range for the pumps is from atmospheric pressure to 140 mbar(a) ultimate pressure (105 Torr(a)) (112.5 Torr(a)) (equivalent to -400 mbar(g) (-300 Torr(g) to 850 mbar(g) (-637.6 Torr(g))).

Always select a correct pressure gauge to measure the vacuum. Note that the distinction does not matter for a pressure difference (delta P, for example, pressure loss), since it is always the result of subtracting two pressures (as absolute or effective pressures).

3.1.1 Pressure pumps and variable speed drive

Speed regulation on pressure pumps can be done with an inverter an PI Loop, but only between a window of 40-50 Hz or 40-60 Hz depending on the grid. For other turn down ratio's please consult us.

3.2 Introduction

The pump is a single-stage, dry vacuum or overpressure pump driven by an electric motor. The pump is designed to function as a vacuum pump or an overpressure pump depending on its configuration.

The pump is designed to work with clean air, inert gas or small amounts of water vapour. The ambient temperature must be between 0 °C to 40 °C (32 °F to 104 °F).

The pump is air-cooled and is covered with a sound-insulated body. The body helps to reduce the noise, maintain cleanliness and transfer heat.

The pump is designed for complete flexibility and quick access to all parts. The pump mainly includes dry claw element, gearbox, electric motor and drive train. All the components are mounted on a common base frame.

General description

Element

The pumping chamber consist of duplex set of rotating claws or rotors on cantilevered shafts. The two claws and the cylinder are all non-touching but have accurate clearances to allow a very efficient performance. The chamber is lubrication free and designed with corrosion resistant material.

Inlet non-return valve

The Inlet non-return valve prevents reverse flow of the inlet air and thus prevents reverse rotation of the pump.

Gearbox

The element is driven through an oil lubricated gearbox housing synchro-meshing gears which is coupled to a direct drive motor.

Electric motor

Electric motors are 3 phase multi-voltage multi-frequency type. The main motor options are:

Motor voltage supply range (V)		Approval	
50 Hz	**60 Hz**	**50 Hz**	**60 Hz**
200	200	IEC	UL/cUL
230	230	IEC	UL/cUL
	380		IEC
400		IEC	
	460		UL/cUL
500	575	IEC	IEC - UL/cUL

Note:
A dual voltage 230/460 V 60 Hz motor with UL/cUL approval is also available.

The motors are suited to operate with Variable Speed Drive to have complete control and to reduce power consumption. This efficiency improvement leads to power reduction and a lower carbon footprint.

The pump is supplied with the following standard features:

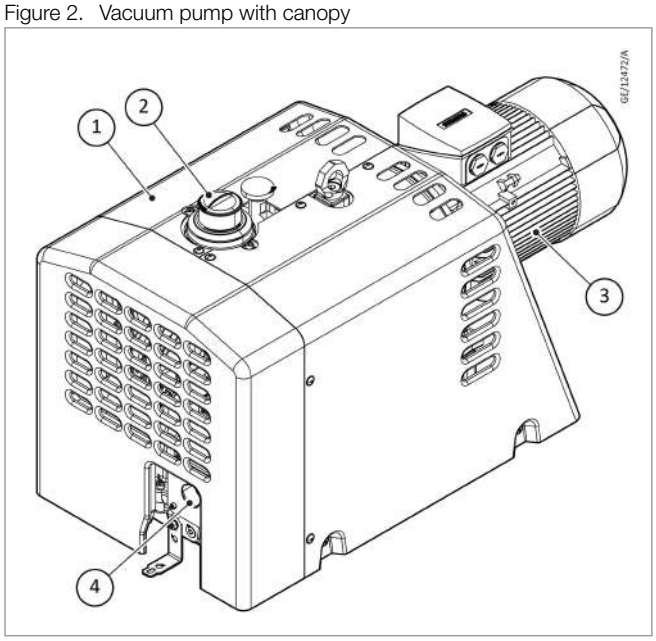
- Vacuum relief valve

  The relief valve is designed to open at a predetermined pressure to protect the pump from damage. When the vacuum level is exceeded, the relief valve opens and allows air to enter the pumping chamber. This has the effect of internal cooling.
- Silencer

  To improve the level of comfort during operation, the pump is equipped with a silencer.

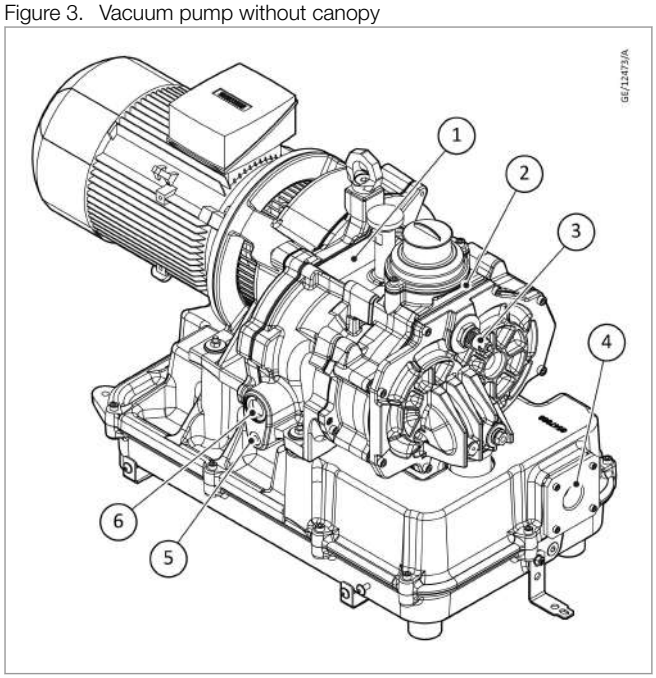
3.2.1 General pump view

Figure 2. Vacuum pump with canopy



1. *Noise reducing canopy*
2. *Inlet non-return valve*
3. *Drive motor (Fixed speed)*
4. *Air outlet*

Figure 3. Vacuum pump without canopy



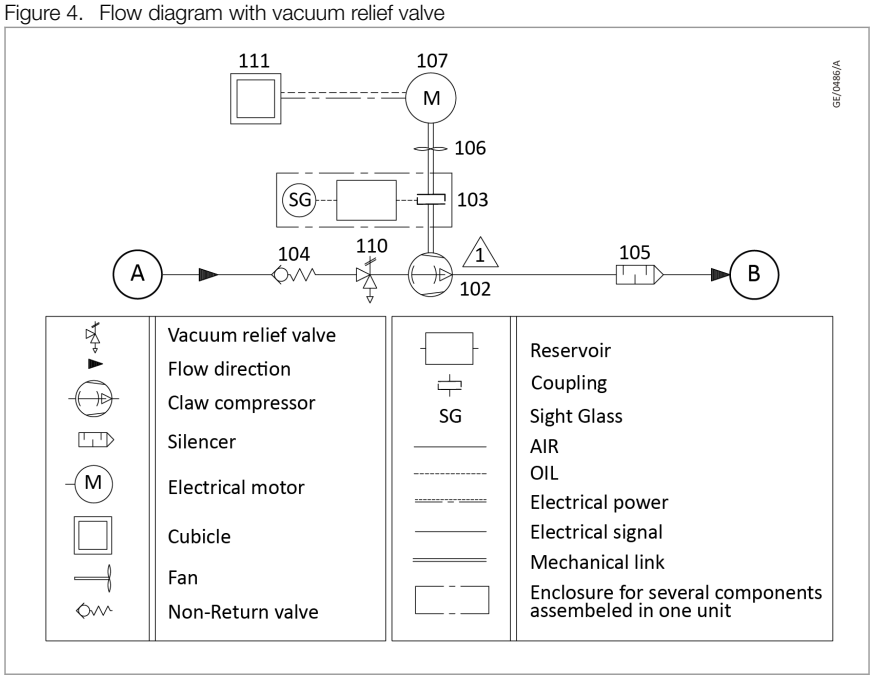
1. *Gearbox*
2. *Element*
3. *Vacuum relief valve*
4. *Exhaust silencer*
5. *Oil drain plug*
6. *Oil sight glass*

3.3 Flow diagram

3.3.1 Vacuum pump

Air comes in through the air inlet and non-return valve. The air is displaced by the vacuum pump element. After passing the element, the air enters the discharge silencer before exiting to the atmosphere.

Figure 4. Flow diagram with vacuum relief valve

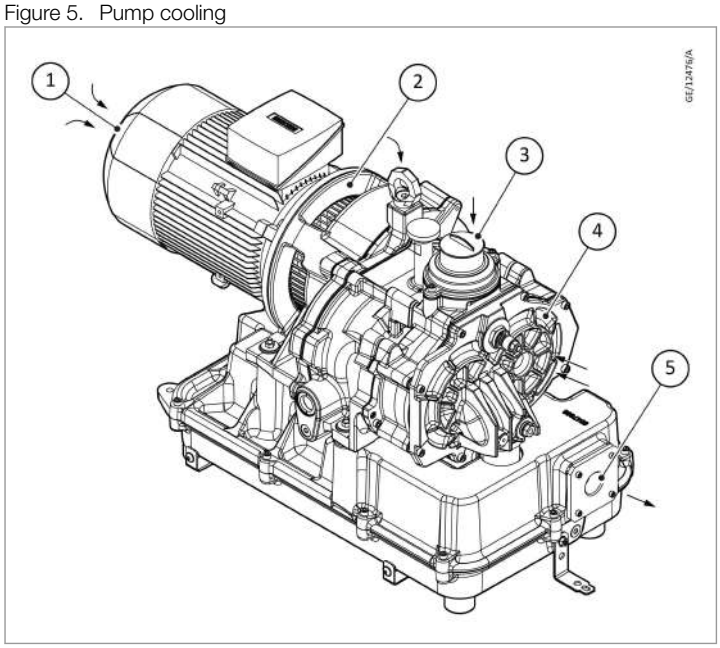


3.4 Cooling

The pump is cooled by forward curved fan installed within the coupling housing. This provides air flow around the pump to aid cooling. The cooling fins also radiate the heat away and the motor fan cools the drive motor.

The gearbox oil is cooled down by recirculation and convection from the fan. In many cases the process gas can also cool the element.

Figure 5. Pump cooling



1. *Motor cooling air inlet*
2. *Element cooling air inlet*
3. *Process air inlet*
4. *Element air flow*
5. *Exhaust out*

3.5 Condensate system

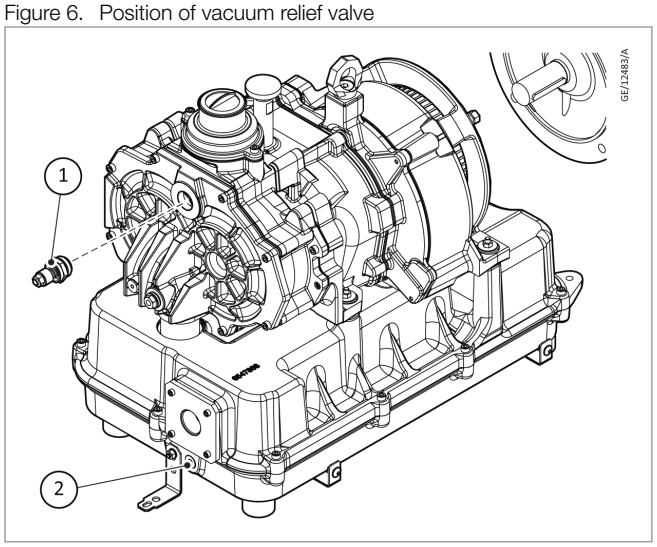
The condensate flows out through a drain port at the base of the exhaust silencing chamber.

When the pump is running in a humid application containing condensable vapors a manual drain valve should be installed in order to drain the silencer regularly.

When the pump is delivered, the drain port is sealed with a threaded plug. It can be exchanged by a connector with tube to drain the condensate. You must obey your local regulations applicable for water drainage.

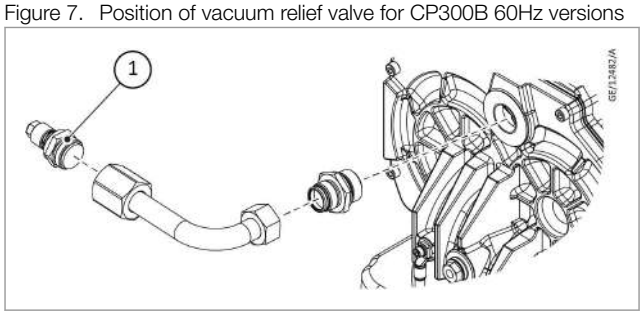
General description

Figure 6. Position of vacuum relief valve



1. Vacuum relief valve *2. Drain port*

Figure 7. Position of vacuum relief valve for CP300B 60Hz versions



1. Vacuum relief valve

4 Technical data

4.1 General technical data

Table 1. Pump and motor weight

Pump type	Motor weight		Unit weight	
	Kg	lbs	Kg	lbs
Vacuum pump				
CP 065B	21	46.3	153	337.3
CP 150B	34	75	182	401
CP 300B	57	125.7	304	670

Weight tolerances (oil included) = +/- 10 kg (22 lbs).

4.2 Reference conditions and limitations

Table 2. Reference condition

Parameters	Unit	Value
Relative humidity	%	0
Air inlet temperature	°C	20
	°F	68
Exhaust back pressure	mbar(g)	0
	psi	0
Ambient barometric pressure	mbar(a)	1013
	psi	14.7

Table 3. Limitations

Parameters	Unit	Value
Minimum ambient temperature	°C	0
	°F	32
Maximum ambient temperature	°C	40
	°F	104
Minimum allowable inlet temperature	°C	0
	°F	32
Maximum allowable inlet temperature	°C	40
	°F	104
Maximum (absolute) inlet pressure	mbar(a)	1050
	psi	15.22
Outlet pressure mbar(a) (vacuum pump)	mbar(a)	1013
	psi	14.7

4.3 Pump data

Note:

The readings are valid only when the pump operates in the conditions described in Table: Reference condition.

Technical data

Table 4. Common pump data

Parameter	Unit	Value
Number of compressions		1
Maximum exhaust back pressure	mbar(g)	200
	Torr	900
Temperature of the air leaving the discharge (Approximately)	°C	190
	°F	374

The vacuum pump is designed to work constantly on a pressure from ultimate until atmospheric pressure.

The maximum inlet pressure of the pump is 1050 mbar(a). In case of a higher inlet pressure, contact your pump manufacture.

Table 5. Vacuum pump data

Parameter	Unit	CP 065B	CP 150B	CP 300B
Ultimate pressure*	mbar(a)	50	50	140
	Torr	37.5	37.5	105
Maximum displacement# 50 Hz	m^3/h	65	152	295
	Cfm	38	89	173
Maximum displacement# 60 Hz	m^3/h	79	184	347
	cfm	46	108	204
Connection inlet	-	G 1 1/4" or NPT	G 1 1/4" or NPT	G 2" or NPT
Connection outlet	-	G 1 1/4" or NPT	G 1 1/4" or NPT	G 1 1/4" or NPT
Oil capacity	L	0.7	0.7	1.5
	US GAL	0.185	0.185	0.39
	Imp. GAL	0.153	0.153	0.329
	cu.ft.	0.024	0.024	0.052
Noise level (50 Hz)	dB(A)	66	72	72
Noise level (60 Hz)	dB(A)	72	75	75

** for continuous operation*

 # is within +/- 10-15% tolerance.

4.4 Motor data

Table 6 Motor data

Model	Motor voltage supply range (V)		Nominal current (A)		Nominal speed (RPM)		Nominal power (kW)		Service factor	
	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
CP 065B	200 (Δ)	200 (Δ)	6.9	8.3	2885	3490	1.8	2.2	1.1	1.1
	230 (Δ)	230 (Δ)	6.3	7.6	2910	3520	1.8	2.2	1.1	1.1
	-	230 (YY)	-	7.3	-	3505	-	2.2	-	1.1
	-	380 (Δ)	-	4.4	-	3500	-	2.2	-	1.1
	400 (Y)	-	3.5	-	2910	-	1.8	-	1.1	-
	-	460 (Δ)	-	3.7	-	3505	-	2.2	-	1.1
	500 (Δ)	575 (Δ)	2.8	2.9	2910	3505	1.8	2.2	1.1	1.1
CP 150B	200 (Δ)	200 (Δ)	13.2	13.4	2930	3545	3.7	3.7	1.1	1.46
	230 (Δ)	230 (Δ)	11.8	11.9	2950	3560	3.7	3.7	1.1	1.46
	-	230 (YY)	-	11.8	-	3555	-	3.7	-	1.46
	-	380 (Δ)	-	7.1	-	3555	-	3.7	-	1.46
	400 (Y)	-	6.8	-	2950	-	3.7	-	1.1	-
	-	460 (Δ)	-	5.9	-	3555	-	3.7	-	1.46
	500 (Δ)	575 (Δ)	5.5	4.7	2950	3555	3.7	3.7	1.1	1.46
CP 300B	200 (Δ)	200 (Δ)	21.5	26	2940	3545	6.2	7.5	1.1	1.09
	230 (Δ)	230 (Δ)	19.1	22.5	2960	3560	6.2	7.5	1.1	1.09
	-	230 (YY)	-	22.5	-	3555	-	7.5	-	1.09
	-	380 (Δ)	-	13.7	-	3555	-	7.5	-	1.09
	400 (Y)	-	11	-	2955		6.2	-	1.1	-
	-	460 (Δ)	-	11.3		3555	-	7.5	-	1.09
	500 (Δ)	575 (Δ)	8.8	9.1	2960	3555	6.2	7.5	1.1	1.09

Technical data

Table 7 Order information

Model	Part numbers	Description
CP 065B	10780065V01	CLAWVAC CP 065B 200-230V 50Hz 3Ph
	10780065V02	CLAWVAC CP 065B 380V 60Hz 3Ph
	10780065V03	CLAWVAC CP 065B 400V 50Hz 3Ph
	10780065V04	CLAWVAC CP 065B 575V 60Hz 3Ph
	10780065V07	CLAWVAC CP 065B 230/460V 60Hz 3Ph
	10780065V21	CLAWVAC CP 065B w/o motor 50Hz
	10780065V22	CLAWVAC CP 065B w/o motor 60Hz
	17510065V00DGN	CLAWVAC CP 065B IE4 400V 50Hz 3Ph
	17510065V01DGN	CLAWVAC CP 065B IE4 VSD 380-460V
CP 150B	10780150V01	CLAWVAC CP 150B 200-230V 50Hz 3Ph
	10780150V02	CLAWVAC CP 150B 380V 60Hz 3Ph
	10780150V03	CLAWVAC CP 150B 400V 50Hz 3Ph
	10780150V04	CLAWVAC CP 150B 575V 60Hz 3Ph
	10780150V07	CLAWVAC CP 150B 230/460V 60Hz 3Ph
	10780150V21	CLAWVAC CP 150B w/o motor 50Hz
	10780150V22	CLAWVAC CP 150B w/o motor 60Hz
	17510150V00DGN	CLAWVAC CP 150B IE4 400V 50Hz 3Ph
	17510150V01DGN	CLAWVAC CP 150B IE4 VSD 380-460V
CP 300B	10780300V01	CLAWVAC CP 300B 200-230V 50Hz 3Ph
	10780300V02	CLAWVAC CP 300B 380V 60Hz 3Ph
	10780300V03	CLAWVAC CP 300B 400V 50Hz 3Ph
	10780300V04	CLAWVAC CP 300B 575V 60Hz 3Ph
	10780300V07	CLAWVAC CP 300B 230/460V 60Hz 3Ph
	10780300V21	CLAWVAC CP 300B w/o motor 50Hz
	10780300V22	CLAWVAC CP 300B w/o motor 60Hz
	17510300V00DGN	CLAWVAC CP 300B IE4 400V 50Hz 3Ph
	17510300V01DGN	CLAWVAC CP 300B IE4 VSD 380-460V

4.5 Electrical cable size and fuses

CAUTION: ELECTRICAL CABLE SIZE

Risk of injury and damage to equipment. Check and confirm the fuse size for the calculated cable size. If necessary, decrease the fuse size or increase the cable size. The cable length must not be more than the limit given in IEC 60204 Table 10.

CAUTION: HIGH STARTING CURRENT

Risk of injury and damage to equipment. The starting currents can be 1000% higher than the nominal current of the motor. Make sure that the system is protected against high current flow.

The voltage on the pump terminals must not deviate more than 10% of the nominal voltage. It is recommended to keep the voltage drop over the supply cables at nominal current below 5% of the nominal voltage (IEC 60204-1).

If cables are grouped together with other power cables, it can be necessary to use cables of a larger size than those calculated for the standard operating conditions.

Use the original cable entry. Refer to *Dimension drawings* on page 33. To keep the IP protection degree of the electric cubicle and to protect its components from dust, it is mandatory to use a correct cable gland when you connect the supply cable to the pump.

Local regulations remain applicable if they are stricter than the values proposed in *Table: Currents and fuses*.

Leakage breaker (optional)

If a leakage breaker is necessary for installation, use an all current sensitive leakage breaker, RCM or RCD Type B (refer to IEC/EN 60755) with a sufficient trip level.

Table 8 Currents and fuses

Model	Motor voltage supply range (V)		Imax under voltage		Max. fuse pack IEC class gL/gC	Max. fuse pack UL class K5 CSA HRC from ii	Recomme -nded cable size mm² (P/FF)
	50 Hz	60 Hz	50 Hz	60 Hz			
CP 065B	200 (Δ)	200 (Δ)	8.3	10.0	12	15	4
	230 (Δ)	230 (Δ)	7.6	9.1	10	10	4
	-	230 (YY)	-	8.8	10	10	4
	-	380 (Δ)	-	5.3	6	6	4
	400 (Y)		4.2	-	6	6	4
	-	460 (Δ)	-	4.4	6	6	4
	500 (Δ)	575 (Δ)	3.4	3.5	6	6	4
CP 150B	200 (Δ)	200 (Δ)	15.8	16.1	20	20	4
	230 (Δ)	230 (Δ)	14.2	14.3	16	20	4
	-	230 (YY)	-	14.2	16	20	4
	-	380 (Δ)	-	8.5	10	10	4
	400 (Y)	-	8.2	-	10	10	4
	-	460 (Δ)	-	7.1	8	10	4
	500 (Δ)	575 (Δ)	6.6	5.6	8	10	4
CP 300B	200 (Δ)	200 (Δ)	25.8	31.2	32	40	10
	230 (Δ)	230 (Δ)	22.9	27.0	32	40	10
	-	230 (YY)	-	27.0	32	40	10
	-	380 (Δ)	-	16.4	20	20	4
	400 (Y)		13.2	-	16	20	4
	-	460 (Δ)	-	13.6	16	20	4
	500 (Δ)	575 (Δ)	10.6	10.9	12	15	4

- Fuse size calculations for IEC

  Refer to 60364-4-43 electrical installations of buildings, part 4: protection for safety- section 43: protection against over current.

  Fuse sizes are calculated to give the necessary protection to the cable against short circuits.

- Fuse calculations for cUL and UL

  The recommended fuse size is the maximum fuse size to protect the motor against short circuit.

Technical data

For cUL fuse HRC form II, for UL fuse class K5.

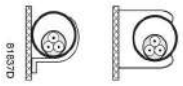
Earthing

The earthing cable size connected to the pump (PE) must be minimum 10 mm^2 as per the EN 60204-1 section 828.

Cable sizing according to IEC

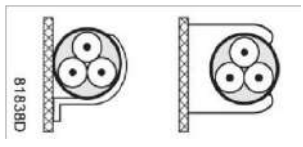
The tables below shows the current carrying capacities of cables for three commonly used installation methods, calculated as per the standard 60364-5-52 - electrical installations of buildings part 5 - selection and erection equipment and section 52 - current carrying capacities in wiring systems.

The permitted currents are valid for PVC insulated cables with three loaded copper conductors (maximum conductor temperature 70 °C (158 °F)).

	Installation method B2 as per the table B.52.1.
	Multi-core cable in conduit on a wooden wall.

Maximum permitted current is function of the ambient temperature for installation method B2.

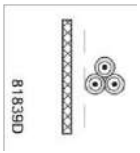
Cable section	Ambient temperature				
	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)
4 mm^2	< 27 A	< 23 A	< 21 A	< 19 A	< 16 A
6 mm^2	< 34 A	< 30 A	< 27 A	< 24 A	< 21 A
10 mm^2	< 46 A	< 40 A	< 36 A	< 33 A	< 28 A
16 mm^2	< 62 A	< 54 A	< 49 A	< 44 A	< 38 A
25 mm^2	< 80 A	< 70 A	< 63 A	< 57 A	< 49 A
35 mm^2	< 99 A	< 86 A	< 78 A	< 70 A	< 60 A
50 mm^2	< 118 A	< 103 A	< 93 A	< 84 A	< 72 A
70 mm^2	< 149 A	< 130 A	< 118 A	< 106 A	< 91 A
95 mm^2	< 179 A	< 156 A	< 141 A	< 127 A	< 109 A
120 mm^2	< 206 A	< 179 A	< 163 A	< 146 A	< 126 A

	Installation method C as per the table B.52.1. Single-core or multi-core cable on a wooden wall.

Maximum permitted current in function of the ambient temperature for installation method C.

Cable section	Ambient temperature				
	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)
4 mm^2	< 32 A	< 28 A	< 25 A	< 23 A	< 20 A
6 mm^2	< 41 A	< 36 A	< 32 A	< 29 A	< 25 A

Cable section	Ambient temperature				
	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)
10 mm^2	< 57 A	< 50 A	< 45 A	< 40 A	< 35 A
16 mm^2	< 76 A	< 66 A	< 60 A	< 54 A	< 46 A
25 mm^2	< 96 A	< 84 A	< 76 A	< 68 A	< 59 A
35 mm^2	< 119 A	< 104 A	< 94 A	< 84 A	< 73 A
50 mm^2	< 144 A	< 125 A	< 114 A	< 102 A	< 88 A
70 mm^2	< 184 A	< 160 A	< 145 A	< 131 A	< 112 A
95 mm^2	< 123 A	< 194 A	< 176 A	< 158 A	< 136 A
120 mm^2	< 259 A	< 225 A	< 205 A	< 184 A	< 158 A

	Installation method F as per the table B.52.1. Single-core cables, touching in free air clearance to wall not less than one cable diameter.

Maximum permitted current in function of the ambient temperature for installation method F.

Cable section	Ambient temperature				
	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)
25 mm^2	< 110 A	< 96 A	< 87 A	< 78 A	< 67 A
35 mm^2	< 137 A	< 119 A	< 108 A	< 97 A	< 84 A
50 mm^2	< 167 A	< 145 A	< 132 A	< 119 A	< 102 A
70 mm^2	< 216 A	< 188 A	< 171 A	< 153 A	< 132 A
95 mm^2	< 264 A	< 230 A	< 209 A	< 187 A	< 161 A
120 mm^2	< 308 A	< 268 A	< 243 A	< 219 A	< 188 A

Calculation method for IEC:

- Single supply cables (3 phases + PE - configuration (1)):
  - Add 10% to the total pump current (ItotPack or ItotFF from the tables)
  - Install the specified fuse on each cable.
- Parallel supply cable (2 x 3 phases + PE - configuration (2)):
  - Add 10% to the total pump current (ItotPack or ItotFF from the tables) and divide by 2
  - Multiply the ampacity of the cables with 0.8 (refer to table A.52.17 (52-E1))
  - Install fuses of half the size of the recommended maximum fuse size on each cable.
- When using 2 x 3 phases + PE as in (3):
  - Add 10% to the total pump current (ItotPack or ItotFF from the tables) and divide by √3
  - Multiply the ampacity of the cables with 0.8 (refer to table A.52.17 (52-E1))

        - Fuse size: the recommended maximum fuse size divided by √3 on each cable.
- Size of the PE cable:
    - For supply cables up to 35 mm²: same size as supply cables
    - For supply cables larger than 35 mm²: half the size of the supply wires

Always check the voltage drop over the cable (less than 5% of the nominal voltage is recommended).

Example: Itot= 89 A, maximum ambient temperature is 45 °C (113 °F) , recommended fuse = 100 A

- Single supply cables (3 phases + PE - configuration (1)):
    - I = 89 A + 10% = 89 x 1.1 = 97.9 A
    - The table for B2 and ambient temperature = 45 °C (113 °F) permits a maximum current of 93 A for a 50 mm² cable. For a cable of 70 mm², the maximum permitted current is 118 A, which is sufficient. Use a 3 x 70 mm² + 35 mm² cable.

If method C is used, 50 mm² is sufficient. (35 mm² for method F) =>cable 3 x 50 mm² + 25 mm².

- Parallel supply cable (2 x 3 phases + PE - configuration (2)):
    - I = (89 A + 10%)/2 = (89 x 1.1)/2 = 49 A
    - For a cable of 25 mm², B2 at 45 °C (113 °F), the maximum current is 63 A x 0.8 = 50.4 A. So, 2 parallel cables of 3 x 25 mm² + 25 mm² are sufficient.
    - Install 50 A fuses on each cable instead of 100 A.

Cable sizing according to UL/cUL

Calculation method according to UL 508A, table 28.1 column 5: permitted ampacities of insulated copper conductors (75 °C (167 °F)).

Maximum permitted current in function of the wire size

AWG or kcmil	Maximum current
10	< 30 A
8	< 50 A
6	< 65 A
4	< 85 A
3	< 100 A
2	< 115 A
1	< 130 A
1/0	< 150 A
2/0	< 175 A
3/0	< 200 A

Calculation method for UL:

- Single supply cables (3 phases + 1 PE - configuration (1)):
    - Add 25% to the total current from the tables (refer to UL 508A 28.3.2: “Capacity shall have 125% of the full load current”)
    - Install the specified maximum fuse on each cable.
- Parallel supply cable (2 x 3 phases + 2 PE - configuration (2)):

    - Add 25% to the total current from the tables and divide by 2
    - Multiply the capacity of the cables with 0.8 (refer to UL 508A table 28.1 continued)
    - Install fuses of half the size of the recommended maximum fuse size on each cable.
- When using 2 x 3 phase + 2 PE as in (3):
    - Add 25% to the total current from the tables and divide by √3
    - Multiply the capacity of the cables with 0.8 (refer to UL 508A table 28.1 continued)
    - Fuse size: the recommended maximum fuse size divided by √3 on each cable.
- Size PE cable:
    - For supply cables up to AWG8: same size as the supply cables
    - For supply cables larger than AWG8: use maximum permitted capacity.

      < 100 A: use AWG8

      < 200 A: use AWG6

      < 300 A: use AWG4

Always check the voltage drop over the cable (less than 5% of the nominal voltage is recommended).

Example of supply cable calculation: Itot= 128 A, maximum ambient temperature is 45 °C (113 °F), recommended fuse = 150 A.

- Single supply cables (3 phases + 1 PE - configuration (1)):
    - I = 128 A + 25% = 128 x 1.25 = 160 A
    - For AWG2/0, the maximum current is 175 A, which is sufficient => use AWG2/0
    - Install the specified maximum fuse (150 A) on each cable.
- Parallel supply cable (2 x 3 phases + 2 PE - configuration (2)):
    - I = (128 A + 25%)/2 = (128 x 1.25)/2 = 80 A
    - For an AWG4, the maximum current is 85 A x 0.8 = 68 A, which is not sufficient. For an AWG3, the maximum current is 100 x 0.8 = 80 A. So, 2 parallel cables of 3 x AWG3 + 2 x AWG8 are sufficient.
    - Install 80 A fuses on each cable.

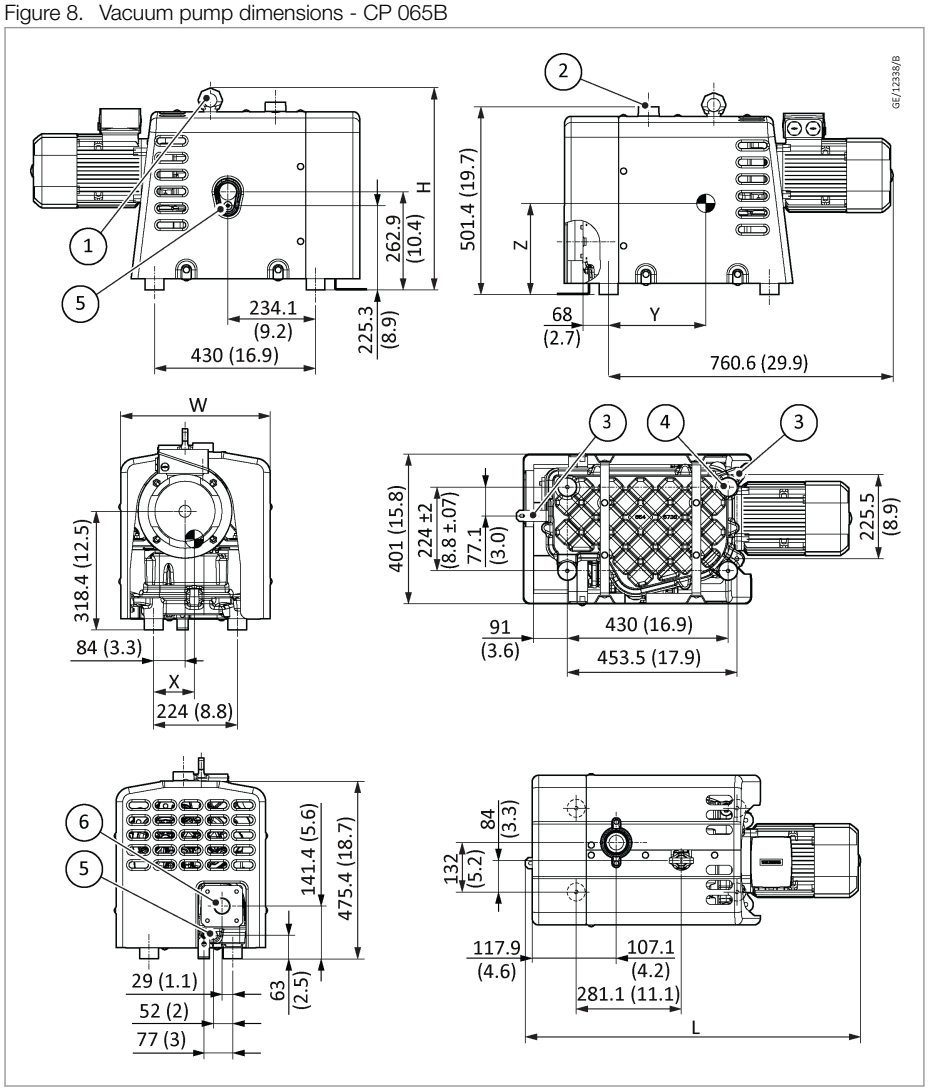
5 Instructions for use

- Operate the pump in the limits given on the data plate.
- Do not make changes to the pump by welding, drilling or by other mechanical methods without the written permission of the manufacturer.
- Only use oil as specified by the manufacturer.
- The pressure and temperature of the pump must be clearly indicated.

6 Installation

6.1 Dimension drawings

Figure 8. Vacuum pump dimensions - CP 065B



1. *Position for eyebolt M16*
2. *Inlet flange G1 1/4"*
3. *Pallet mounting holes 2xØ11/1xØ12*
4. *Floor mounting holes 4 x M10*
5. *Drainage hole M16 x 1.5*
6. *Outlet flange G1 1/4"*

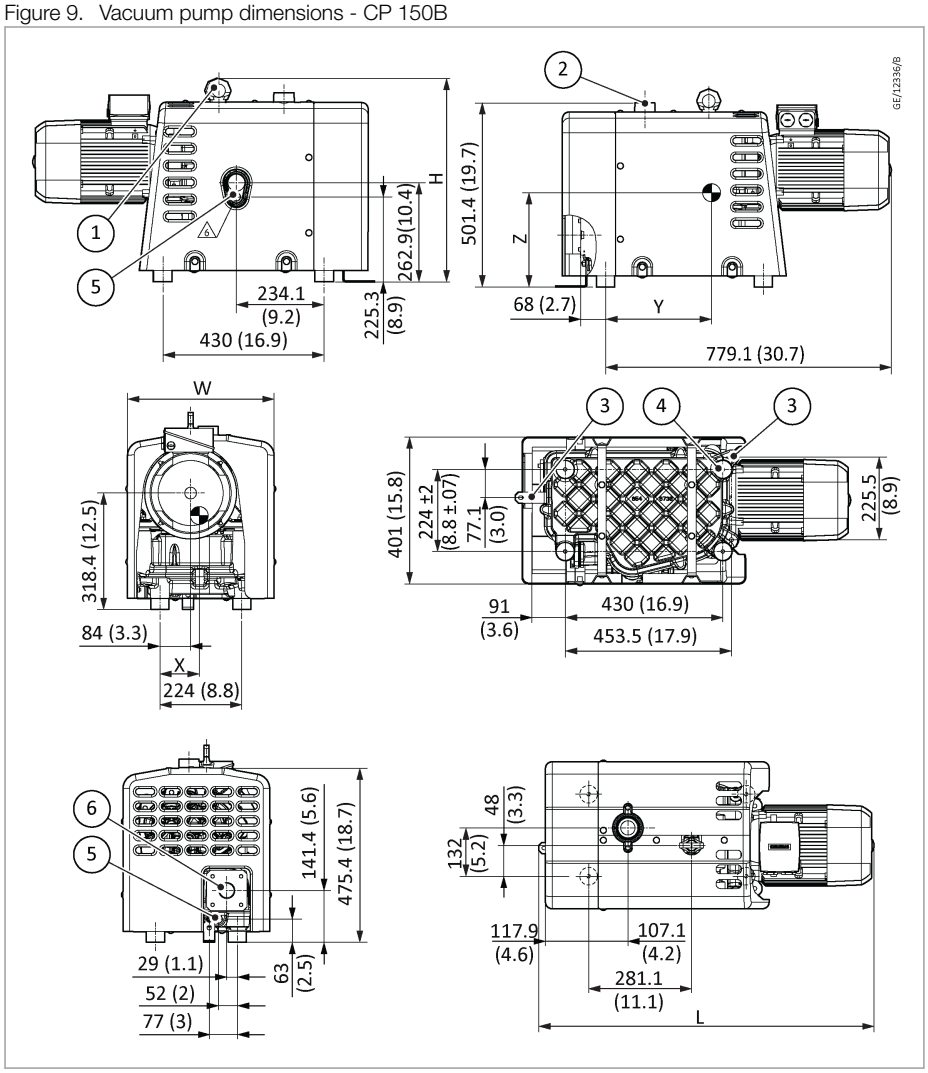
Type	Variable dimensions						Centre of gravity					
	L		W		H		X		Y		Z	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CP 065B*	896	35.3	409	16.1	538	21.1	109	4.3	260	10.2	244	9.6

Dimension tolerances = +/- 10 mm (0.4 inch).

** Additional silencer is not included in these dimensions.*

Installation

Figure 9. Vacuum pump dimensions - CP 150B



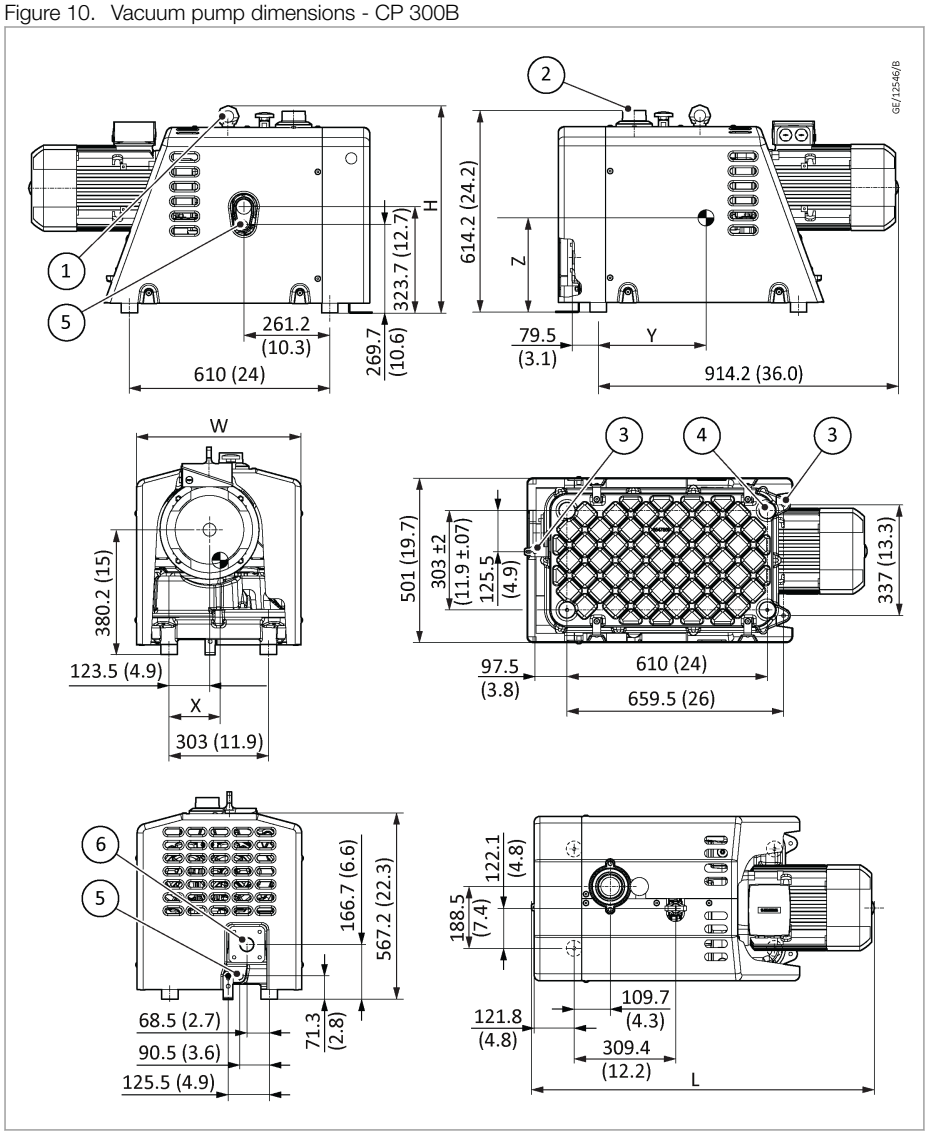
1. *Position for eyebolt M16*
2. *Inlet flange G1 1/4"*
3. *Pallet mounting holes 2xØ11/1xØ12*
4. *Floor mounting holes 4 x M10*
5. *Drainage hole M16 x 1.5*
6. *Outlet flange G1 1/4"*

Type	Variable dimensions						Centre of gravity					
	L		W		H		X		Y		Z	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CP 150B*	915	36.1	409	16.1	538	21.1	108	4.2	289	11.4	257	10.1

Dimension tolerances = +/- 10 mm (0.4 inch).

** Additional silencer is not included in these dimensions.*

Figure 10. Vacuum pump dimensions - CP 300B



1. *Position for eyebolt M16*
2. *Inlet flange G2"*
3. *Pallet mounting holes 2xØ11/1xØ12*
4. *Floor mounting holes 4 x M10*
5. *Drainage hole M16 x 1.5*
6. *Outlet flange G1 1/4"*

Type	Variable dimensions						Centre of gravity					
	L		W		H		X		Y		Z	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CP 300B*	1043	41.1	508	20.0	631	24.8	156	6.1	328	12.9	287	11.3

Dimension tolerances = +/- 10 mm (0.4 inch).

** Additional silencer is not included in these dimensions.*

Installation

6.2 Installation proposal

CAUTION: INSTALLATION SAFETY

Risk of damage to equipment. The pump is designed to be installed and operated in a safe environment areas where there is no risk of explosion. Environmental conditions must comply with the protection class of the motor as given on its name plate.

CAUTION: HOT SURFACE

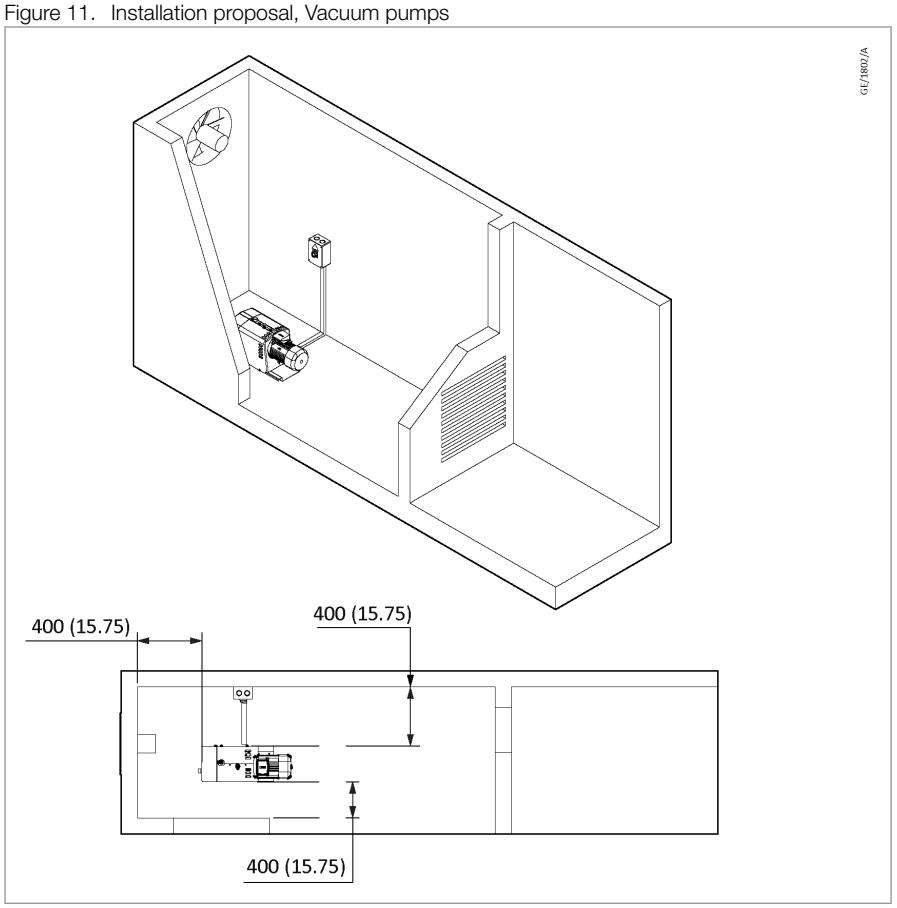
Risk of burn injury. The pump surface and exhaust gas will be hot. You must consider the safety of personnel when the pump is installed.

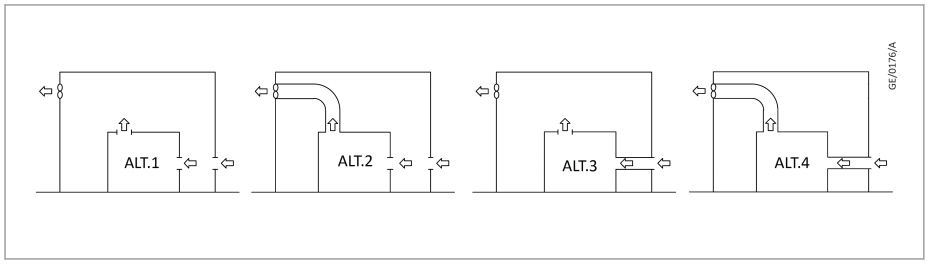
Note:

All pipes should be installed stress free to the pump unit.

- Install the pump horizontally on a level surface. The surface must be:
  - clean
  - vibration free
  - well lit
  - ventilated
  - capable to support the weight of the pump.
- You must provide a support for complete length of the pump. Add a shim where it is necessary. Do not use wood for support.
- Make sure that the pipes attached to the pump are not under stress.
- Make sure that the ambient temperature is not more than the specified temperature. Refer to *Technical data* on page 23.
- The pump is designed for indoor installation. For outdoor installation, you must provide necessary weather protection.
- Make sure that hot exhaust air from other pump or heat generating equipment does not enter in the pump.
- The flow of exhaust air from the pump must not be blocked. Release the hot exhaust air outside to prevent high ambient conditions in the room.
- Refer to *Table: Limitations* for operation criteria. If it is necessary to operate the pump outside the criteria, contact us.
- A sufficient space is necessary on all sides and top of the pump for the safe and correct installation, daily inspection and maintenance.
- It is not necessary to fix the pump to the ground. Fix the pump to the ground if it is mounted on a frame or a structure that may result in the movement of the pump. Always consider using anti-vibration mounts.
- The pump is designed for operation in a safe environment where there is no risk of explosion. Environmental conditions must comply with the protection class of the motor as marked on its name plate.
- You must install thermal insulation for protection against the intense heat which can be generated around the exhaust of the pump.

Figure 11. Installation proposal, Vacuum pumps





All dimensions are in mm (inch)

6.2.1 Piping connection

The piping connection for process, exhaust and all related components must be designed in accordance with generally accepted engineering practises and as per the local laws and regulations. For piping connections, we recommend the practises that follow:

- The process pipes must be of correct size to decrease the loss of performance and prevent damage to the pump.
- All pipework, filters and accessories must be fully supported to reduce physical stress on the pump.
- The vibration transmission through the pipework must be minimised.
- The process pipe should be installed sloping away from the pump to prevent the condensate to go back into the pump. Install filtration equipment if particulates can carry-over. The filtration equipment of 5 micron or less is ideal. Make sure that the volume of the pipe is big enough to have a correct regulation of the unit. If this is not possible, install a correctly sized vessel.

- The pipes must be straight with no tight bends, fold or twists. The pipes should be sized correctly to decreases the losses. Use the same diameter of pipe for the pump process connection. Correct sizing is necessary for the folded, twisted or the pipes with a length more than 10 meter.
- Use easy to release and flexible connection at the final connection to the pump.
- The process isolation valves are necessary. For the vacuum pump, do not isolate the exhaust to prevent high back-pressure. Install a drip-leg drain or a low position drain point.
- The exhaust silencer has a drain plug or drain tab and consideration must be given to deal with the condensate drain off.
- The pipe material must be compatible with the process medium.
- The discharge air of a vacuum pump can have temperature up to 190 °C (374 °F). Make sure that the connection pipes are compatible for this temperature range.
- Make sure that there is no leakage in the pipes and accessories to prevent the decrease in the performance and efficiency of the pump.
- Do the regular inspection and leak test of the system.
- Make sure that the pipe is cleaned internally and there are no blockage before you start the pump.

6.2.2 Ventilation

For ventilation at the site of installation, consider the points that follow:

- Do not recirculate the hot air from the pump ventilation ports back to the pump cooling system and relief valve. This will cause less cooling and overheating.
- The air velocity to the grids must not be more than 5 m/s.
- The maximum air temperature at inlet is 40 °C (104 °F) and the minimum air temperature is 0 °C (32 °F).

Refer to *Installation proposal* on page 36 for ventilation alternatives.

- Alternative 1 and 3

  The necessary ventilation to limit the room temperature of the pump is calculated as:

  Qv = 1.06 N / T

  Where,

  - Qv = Necessary cooling air flow (m^3/s)
  - N = Nominal motor power of the pump (kW)
  - T = Temperature increase in the pump room (°C)
- Ventilation alternative 2 and 4: The fan capacity must match the pump - fan capacity at a pressure head equal to the pressure drop caused by the cooling air ducts.

  Maximum permitted pressure drop in ducting before or after the pump = 10 Pa

6.2.3 Outdoor installation

As standard, the pump is designed for indoor use. Weather resistant variants are designed to be located in outdoor conditions with limitations defined in *Table: Limitations*. please take special precautions and contact us.

The pumps can only be used in temperatures more than 0 °C (+ 32 °F). If frost occurs, take applicable protective steps to prevent the damage to the pump and its ancillary equipment. Contact us for details.

If it is necessary to operate the pump at more than 1000 m (3300 ft), contact us.

6.2.4 Position the pump

WARNING: HEAVY OBJECT

Risk of injury and damage to the equipment. Do not lift the pump if the external body (canopy) parts or lifting supports are not fully installed. When the pump is being lifted, do not stand below the load or do the maintenance work.

CAUTION: LIFTING ANGLE

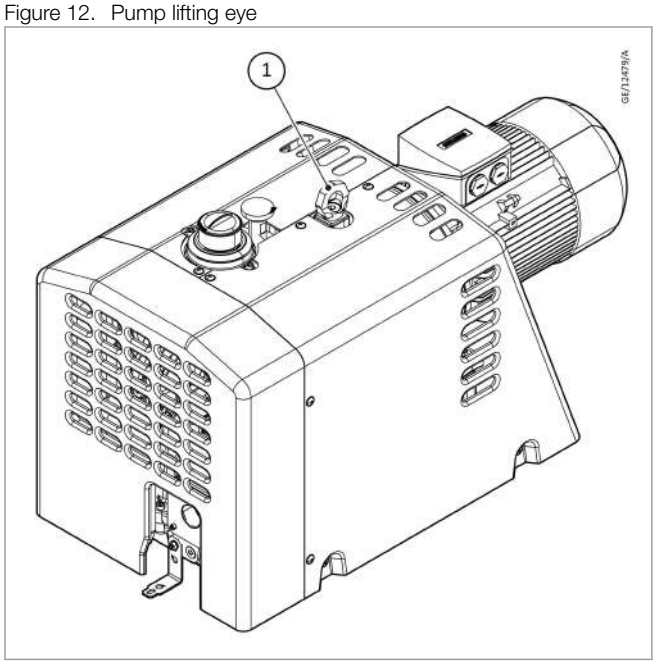
Risk of injury and damage to the equipment. Always check the centre of gravity before you lift the pump. Some pressure pumps are heavy and will tilt when you lift the pump.

The pump is delivered on a wooden pallet. During transport, the pump is secured to the pallet using bolts to prevent from damages. Remove the transport fixation bolt before you lift the pump.

When you move the pump to its installation position, consider the points that follow:

- Lift the pump carefully with a hoist of appropriate lifting capacity.
- You must use the lifting eye provided at the top of the pump to lift the pump. Refer to *Figure: Pump lifting eye*.
- The pump can be moved by a hoist using the lifting eye. Take care not to damage the bodywork during lifting or transport.
- Make sure that that the eyebolt is fully inserted in the lifting boss. The eye bolt must be in serviceable condition and rated according to the load of the pump.
- The motor is also equipped with an eyebolt but it is designed only for the motor. You must use the eyebolt installed at the pump for lifting the pump assembly. Do not use the motor eyebolt.

Figure 12. Pump lifting eye



1. *Lifting eye*

6.2.5 Acclimatization

CAUTION: MOISTURE FORMATION

Risk of damage to equipment. To prevent moisture that can damage the electrical components, make sure that a minimum of 2 hours of acclimatization is done before you start the pump.

When you move the pump to the installation room, condensation can occur on some components. Make sure that the pump is left idle for minimum 2 hours to adjust in the installation room condition.

6.3 Electrical connections

CAUTION: MOTOR ROTATION

Risk of damage to equipment. Before you start the machine, check the rotation direction of the motor to prevent pump failure. Motor rotation direction must be clockwise (when viewed from non-drive side to drive side) for all motors. Correct direction of rotation is marked on the motor fan.

If the direction is wrong, switch off the voltage and reverse two incoming electric lines.

Always use a protection system, including an overcurrent protection and an electrical disconnecting device between the pump and the electrical power supply. The protection system must prevent the pump from automatic restart after power failure. If this is not possible, attach a sign near the pump that states "Danger: This machine may start without warning".

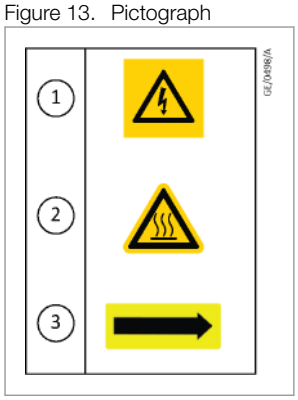
Refer to *Motor data* on page 25 and the motor data plate for motor current details. The pump is delivered without electrical cable and switch. For the electrical connection, check the diagram inside the terminal box or on the motor data plate.

For the selection of the correct cables and fuses, refer to *Electrical cable size and fuses* on page 26.

Your local legislations may require you to install an emergency stop device to stop the pump in case of any hazardous situation. Consult us for details.

6.4 Pictographs

Figure 13. Pictograph



1	Warning: Voltage
2	Warning: Hot surface
3	Rotation direction of fan

7 Operation

7.1 Initial start-up

CAUTION: OPERATIONAL SAFETY

Risk of damage to equipment. The operator must apply all relevant safety precautions. Refer to *Safety precautions during operation* on page 12.

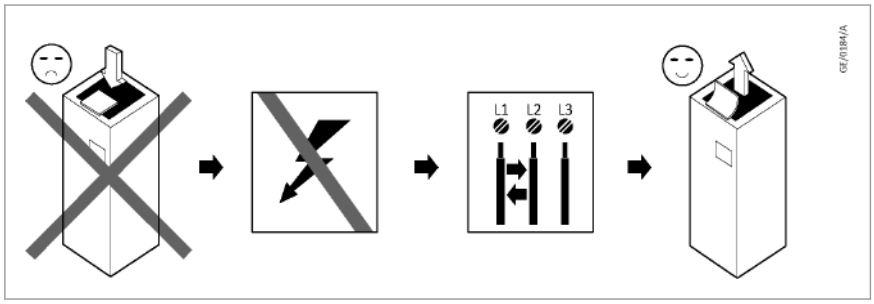
CAUTION: HUMID APPLICATION

Risk of damage to equipment. If it is necessary to operate the pump on a humid applications, we recommend to let the pump reach the optimal operating temperature before you use it for the operation. To do this, operate the pump against a closed suction line for 30 minutes.

Note:

The pump is supplied with oil in the gearbox.

1. Remove the external body (canopy) panels to get access to the internal components.
2. Check the process lines for the correct size to prevent high pressure drop and for cleanliness to protect the pump.
3. Make sure that the pump outlet is not blocked.
4. Make sure that the electrical connections correspond to the local codes and that all wires are clamped tight to their terminals.
5. The installation must be earthed and protected against the short circuits by fuses of the inert type in all phases. Install an isolating switch near the pump.
6. Check the oil level. The minimum level should reach the oil sight glass when the pump is stopped. If needed, top up the oil.
7. Take care that no dirt drops into the oil system. Refit and tighten the filler plug.
8. Give labels, warning to the operator that:
   - The pump can automatically restart after the voltage failure (if activated, contact us).
   - The pump is automatically controlled and can be automatically restarted.
   - The pump can be remotely controlled.



9. Start and operate the pump for a few minutes. Check the rotation direction of the motor. The correct rotation direction of the drive motor is shown by an arrow shown on the motor fan cowl.

   If the rotation direction of motor is incorrect:

   - Open the isolating switch.
   - Reverse two incoming electric lines.

   Incorrect rotation direction of the motor can cause damage to the pump.
10. Start and operate the pump for a few minutes. Check that the pump operates normally.
11. Open the inlet isolation valve.
12. Install the external body (canopy) panels.

7.2 Start the pump

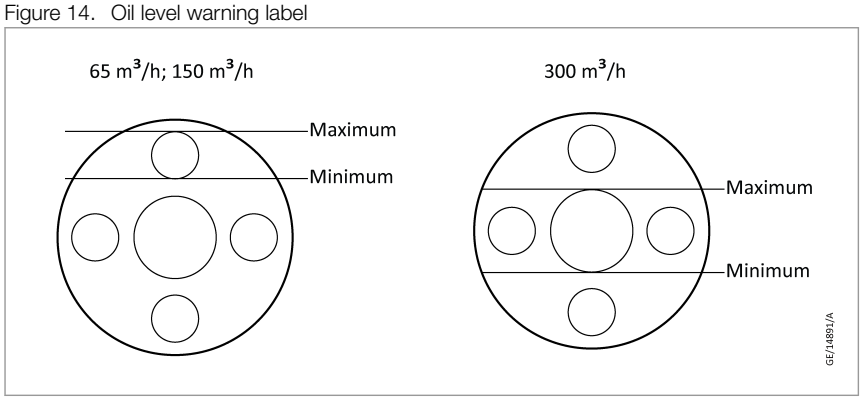
CAUTION: STARTING FREQUENCY

Risk of damage to equipment. To prevent the excessive energy consumption and damage to the pump, the maximum permitted starting frequency is 30 starts per hour.

To start the pump:

1. Check the oil level and the oil condition.
2. Switch on the voltage.

Figure 14. Oil level warning label



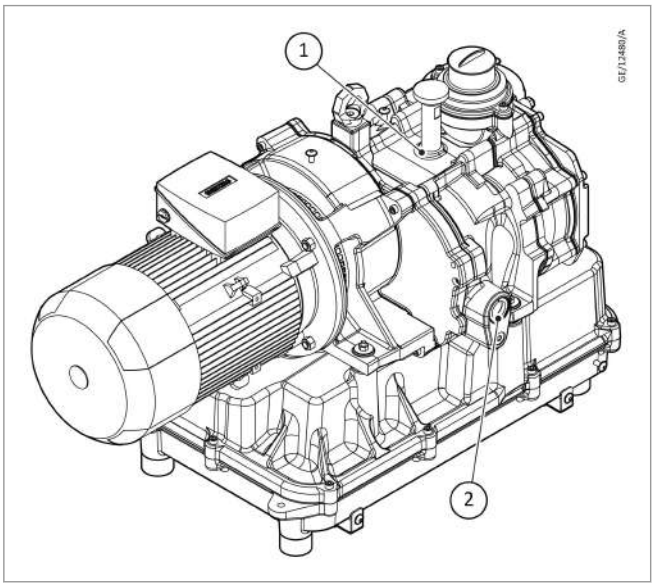
7.3 During operation

Regularly check the oil level and the oil condition. The oil level must be visible through the oil sight glass. It must not exceed the limits marked on the warning label. For accurate oil level measurement, the pump must be heated (when in operation) or cooled (when stopped) for at least 90 minutes. If the oil level is low, refill the oil with correct type of lubricants.

To fill the oil in gearbox, do the steps that follow:

1. Remove the canopy panel(s) in order to get access to the internal components.
2. Remove the oil filler plug.
3. Pour oil in the gearbox. Make sure that the oil is not above the maximum oil level marked on *Figure: Oil level warning label*.
4. Close the filler plug.
5. Remove all oil spills on the pump and the floor.

6. Reinstall the canopy panel(s).



1. Oil filler plug *2. Oil sight glass*

7.4 Stop the pump

In case of applications with a high concentration of condensable vapors it is recommended to run a ‘pre purge’ and ‘post purge’ warm-up and shutdown procedure.

To warm up the pump the pump can be run against a closed inlet valve for around 5-10 minutes. After this the pump is ready for operation in a humid process.

To shut down the pump running on a humid application, the pump should be isolated from the process by closing a inlet valve. Run the pump for around 10-15 minutes against a closed inlet valve in order to evaporate any remaining vapors and or liquids that might condense in the pumps system.

7.5 Taking out of operation

To take the pump out of operation, set the voltage to off and disconnect the pump from the mains power supply.

8 Maintenance

WARNING: HIGH VOLTAGE

Risk of injury or damage to equipment. Isolate the pump from the customer's network before you do the adjustment on the pump.

Before you do the maintenance, repair or adjustment:

1. Stop the pump.
2. Close the isolation valve and wait for 3 minutes.
3. Push the emergency stop button and set the voltage to off.
4. Release the pressure by venting the process side of the pump (if it is safe to do).
5. Open and lock the isolation switch.
6. Lock the air inlet isolation valve.

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 and for preventive maintenance, service kits are available. Service kits comprise all parts required for servicing the component and offer the benefits of genuine parts while keeping the maintenance budget low.

Service contracts

We offer several types of service contracts, relieving you of all preventive maintenance work. Consult us for more details and a customised maintenance plan for your machine.

General

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

Intervals

The local Customer Centre may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the pump.

The longer interval checks must include the shorter interval checks.

8.1 Preventive maintenance schedule

CAUTION: PUMP LEAKAGE

Risk of damage to equipment. You must seal the leaks immediately and replace the damaged hoses or the flexible joints.

Maintenance

CAUTION: OIL LEVEL

Risk of damage to equipment. We recommend to monitor the oil condition through the sight glass and to change the oil when it becomes discoloured. Not changing oil in time can result in failure of the pump.

For safe operation and long service life of the pump, you must examine the pump as described in *Table: Preventive maintenance schedule*. The table describes the maintenance schedule for a "normal", "medium" or "harsh" application with your pump manufacturers oil.

The maintenance schedule can change depending on harshness of the process. The pump condition is defined as “normal”, "medium" or “harsh" based on the process and machine room specifications. Each operating condition has a dedicated service requirement. Contact your pump manufacturer for more guidance and a tailor-made service plan to guarantee your Warranty/Product Liability coverage in line with the used oil of your pump manufacturer.

Your maintenance requirement will change if the vacuum pump is exposed to process or external pollutants such as humidity, dust or high cycle times. Contact your pump manufacturer to align your preventive maintenance needs and guarantee your Warranty/Product Liability coverage.

Note:
The bearings of the motor are greased for life.

Table 9 Preventive maintenance schedule

Action	Normal operating conditions	Medium operating conditions	Harsh operating conditions
Check oil level and top up as required	Weekly	Weekly	Weekly
Visual inspection for damage and leakage			
Observe pump operation for excessive noise, temperature or vibration	Monthly	Every 3 weeks	Every 2 weeks
Essential cleaning			
Inspect motor fan and clean if necessary			
Drain silencer	4000 hours or every year*	3000 hours or every 6 months*	2000 hours or every 3 months*
Open pump chamber cover and clean			
Check synchronization of claws			
Replace the air filter elements, if installed			
Replace oil for harsh applications	-	-	4000 hours or every 6 months*
Replace the shaft seals and bushings at module side	20000 hours or every 4 years*	15000 hours or every 3 years*	10000 hours or every 2 years*
Replace oil			
Inlet valve overhaul			
Clean element fan			
Replace motor coupling element			

Action	Normal operating conditions	Medium operating conditions	Harsh operating conditions
Replace gearbox assembly	48000 hours or every 10 years*	36000 hours or every 7.5 years*	24000 hours or every 5 years*
Minor fixes to superficial damages			

** Whichever comes first*

8.2 Spare kit

Following kits of parts are used for preventive maintenance.

Table 10. Spare kit

Kit name	Kit part number
A-Visit Kit Dry Claw CP 065/150B	**GK9100008**
O-ring 210 x 3 FKM	23970202
O-ring 42 x 5 FKM	23970516
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
A-Visit Kit Dry Claw CP 300B	**GK9100010**
O-ring 280 x 3 FKM	100002073
O-ring 60 x 6 FKM	6547859
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
C-Visit Kit Dry Claw CP 065/150B	**GK9100012**
O-ring 210 x 3 FKM	23970202
O-ring 42 x 5 FKM	23970516
O-ring 37.77 x 2.62 FKM	0663210603
Piston 48 mm	1637009390
Spring Ø19 Lo = 26 mm	1637009389
O-ring 64 x 3 FKM	20011198
O-ring 32.1 x 1.6 FKM	0663713100
O-ring 75 x 3 FKM	23970301
Bushing 65/150	6542279
Lipseal 65/150	6549381
Piston ring 65/150	0680120005
Coupling element 65/150	6545665
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
C-Visit Kit Dry Claw CP 300B	**GK9100014**
O-ring 280 x 3 FKM	100002073
O-ring 60 x 6 FKM	6547859
O-ring 56.2 x 2.62 FKM	0663212087

Maintenance

Kit name	Kit part number
Piston 68.5 mm	1637009084
Spring Ø28 Lo = 47 mm	1637009077
O-ring 110 x 3 FKM	23970001
O-ring 32.1 x 1.6 FKM	0663713100
O-ring 90 x 3 FKM	23970302
Bushing 300	6542278
Lipseal 300	6544975
Piston ring 300	0680120006
Coupling element 300	6545666
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
D-Visit Kit Dry Claw CP 065B	**GK9100016**
O-ring 210 x 3 FKM	23970202
O-ring 42 x 5 FKM	23970516
Washer	6542276
Gearbox assembly 65	6554157
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
D-Visit Kit Dry Claw CP 150B	**GK9100018**
O-ring 210 x 3 FKM	23970202
O-ring 60 x 6 FKM	6547859
Washer	6542276
Gearbox assembly 150	6554197
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
D-Visit Kit Dry Claw CP 300B	**GK9100020**
O-ring 280 x 3 FKM	100002073
O-ring 60 x 6 FKM	6547859
Washer	6542276
Gearbox assembly 300	6554156
Spring lock washer DIN 127 - B 6 - A2	03161386
Gasket, flat 22 x 15.1 x 2, Viton, 83 dur	23955165
Shaft Seal Kit Dry Claw CP 065/150B	**GK9100022**
O-ring 210 x 3 FKM	23970202
O-ring 42 x 5 FKM	23970516
O-ring 32.1 x 1.6 FKM	0663713100
O-ring 75 x 3 FKM	23970301
Bushing 65/150	6542279
Lipseal 65/150	6549381

Kit name	Kit part number
Piston ring 65/150	0680120005
Shaft Seal Kit Dry Claw CP 300B	**GK9100024**
O-ring 280 x 3 FKM	100002073
O-ring 90 x 3 FKM	6547859
O-ring 32.1 x 1.6 FKM	0663713100
O-ring 90 x 3 FKM	23970302
Bushing 300	6542278
Lipseal 300	6544975
Piston Ring 300	0680120006
Motor Shaft Seal Kit Dry Claw CP 065-300B	**GK9100026**
Radial lip seal	6544977
Sealbus	6542277
Circlip	6544981
Claw Fixing Kit Dry Claw CP 065B	**GK9100027**
Hex. screw ISO 4017 - M8 x 30 - 12.9	6548251
Thrust washer, M8 - 10.9	6546291
Gripring 35 x 40 x 7	6544980
Claw FIxing Kit Dry Claw CP 150B	**GK9100028**
Hex. socket screw ISO 4762 - M12 x 40 - 10.9 self	6555910
Thrust washer, M12 - 10.9	6541813
Gripring 35 x 40 x 7	6544980
Claw Fixing Kit Dry Claw CP 300B	**GK9100029**
Hex. socket screw ISO 4762 - M12 x 40-10.9 self	6555910
Thrust washer, M12 - 10.9	6541813
Gripring 35 x 40 x 7	6544980
Shim Kits Dry Claw	**GK9100031**
Shim 35 x 43 x 4.88	6542289
Shim 35 x 43 x 4.91	6542290
Shim 35 x 43 x 4.94	6542291
Shim 35 x 43 x 4.97	6542292
Shim 35 x 43 x 5.00	6542293
Shim 35 x 43 x 5.10	6542294
Shim 35 x 43 x 4.93	6545026
Shim 35 x 43 x 4.96	6545027
Shim 35 x 43 x 4.99	6545028
Shim 35 x 43 x 5.02	6545029
Shim 35 x 43 x 5.05	6545070
Shim 35 x 43 x 5.08	6545071

Kit name	Kit part number
Shim 35 x 43 x 5.11	6545072
Shim 35 x 43 x 5.14	6545073
Inlet Valve Kit Dry Claw CP 065/150B	**GK9100032**
O-ring 37.77 x 2.62 FKM	0663210603
Piston 48 mm	1637009390
Spring Ø19 Lo = 26 mm	1637009389
O-ring 64 x 3 FKM	20011198
Inlet Valve Kit Dry Claw CP 300B	**GK9100034**
O-ring 56.2 x 2.62 FKM	0663212087
Piston 68.5 mm	1637009084
Spring Ø28 Lo = 47 mm	1637009077
O-ring 110 x 3 FKM	23970001

Replace claw fixing screws part number G6548251 when unscrewing it for the variants 65.

Replace claw fixing screws part number G6555910 when unscrewing it for all the variants 150 and 300.

Spare part air filter element for relevant product versions can be ordered under product number G1613872000.

When changing bushings at module side, shim replacement may be required. All shim sizes are available in the Shim Kit GK9100031.

8.3 Oil specification

WARNING: LUBRICATION OIL

Risk of damage to equipment. Do not mix lubricants of different brands or types as they can possibly not be compatible and the oil mix will have inferior properties.

We recommend to use our genuine vacuum lubricants. They are the result of years of field experience and research. Refer to *Table: Preventive maintenance schedule* for the applicable replacement intervals.

GL+ Xpand 150

GL+ Xpand 150 fluid is a specially developed lubricant for use in the gearbox of the pump. Its specific composition keeps the pump in excellent condition. For information on oil capacity, refer to *Table: Vacuum pump data* on page 24.

Oil specification	Part number
GL+ Xpand 150	3002614073

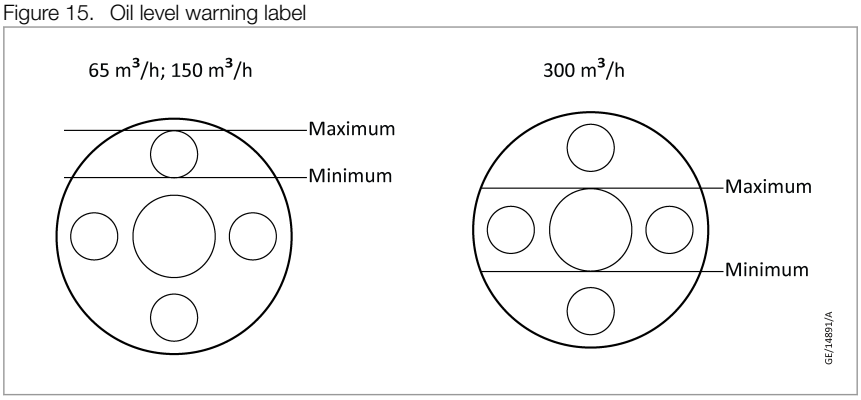
8.4 Adjustments and servicing procedures

8.4.1 Fill the oil

1. Remove the filler plug.

2. Fill the gearbox with oil until it is visible in the oil sight glass but does not exceed the maximum level indicated on the label. Refer to *Figure: Oil level warning label*. Make sure that no dirt drops into the system.
3. Refit and tighten the filler plug.
4. Run the pump for 90 minutes to stabilize the pump temperature.
5. Check if the oil level is above the minimum level marked on the label.

Figure 15. Oil level warning label



When the oil level is low, repeat the steps.

8.4.2 Clean fans and vent holes

Keep the external body (canopy) fans, motor fan, element cooling fan and vent holes clean. Use the compressed air and a dry cloth to clean this parts. Do not use fluids or substances other than given in this manual.

9 Fault finding

WARNING: HIGH VOLTAGE

Risk of injury or damage to equipment. Isolate the pump from the customer's network before you do the adjustment on the pump.

Before you do the maintenance, repair or adjustment:

1. Stop the pump.
2. Close the isolation valve and wait for 3 minutes.
3. Push the emergency stop button and set the voltage to off.
4. Release the pressure by venting the process side of the pump (if it is safe to do).
5. Open and lock the isolation switch.
6. Lock the air inlet isolation valve.

Fault	Pump does not start
Cause	**No voltage or wrong voltage**
Remedy	Check power supply
Cause	**Wrong connection**
Remedy	Modify motor connections according to model label.
Cause	**Motor damaged**
Remedy	Contact us
Cause	**Coupling damaged**
Remedy	Contact us
Cause	**Fan damaged**
Remedy	Contact us

Fault	Pump does not create vacuum
Cause	**Motor runs in wrong direction.** **Phase switch in motor junction box.**
Remedy	Modify motor connections according to motor label.

Fault	Pump does not reach vacuum
Cause	**Too high pressure drops between process and pump inlet.**
Remedy	Test pump with closed isolation valve. Check the process lines for leakage. Correct if necessary.

Cause	**Inlet piping sized incorrectly.**
Remedy	Check installation guidelines in user manual.
Cause	**Inlet filter blocked.**
Remedy	Clean inlet filter, drain liquid separator.
Cause	**Clogged air inlet filter.**
Remedy	Replace inlet filter cartridge.
Cause	**Vacuum relief valve opens too fast / stays open.**
Remedy	Contact us

Fault	Application does not keep vacuum
Cause	**Pressure drops between process and pump inlet.**
Remedy	Check the process lines for leakage. Correct if necessary.
Cause	**Inlet non-return valve is blocked.**
Remedy	Contact us.

Fault	Pump is running hot
Cause	**Insufficient cooling air.** **Cooling air temperature or relative humidity to high**
Remedy	Check for cooling air restriction. Improve ventilation of the utility room. Avoid recirculating of cooling air. If installed, check capacity of pump room fan.
Cause	**Ambient temperature too high**
Remedy	Check user manual for limitations.
Cause	**Low oil level.**
Remedy	Re-fill gearbox if necessary. Check for possible leakages.

Fault	Excessive noise
Cause	**Touching claws or damaged gears.**
Remedy	Contact us

Fault	Pump is blocked
Cause	**Foreign material has entered the pump.**
Remedy	Install an inlet filter to prevent foreign material entering the pump. Clean inlet filter, drain liquid separator. Clean the module.
Cause	**Pump element out of order Internal parts are worn or damaged**
Remedy	Contact us

10 Storage

Store the pump in a clean, dry and isolated area. Cover the pump to protect from mechanical damage.

If the pump is going to be stored without operation from time to time, protective measures must be taken. Contact us for details.

Short term storage

If the pump is put into storage for short term, do the steps that follow:

1. Isolate the pump from the suction inlet and exhaust outlet.
2. Make sure that the pump is clean and dry from the process or condensation in the element.
3. To keep the efficiency of the rubber parts and lip seals, operate the pump with closed intake for minimum 30 minutes after every 6 months.

Long term storage

If the pump is put into storage for long term, make sure to follow all precautions. Contact us when it is necessary to start the pump or when you do decommissioning.

11 Disposal

DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL and UK DIRECTIVE 2013 – S.I. 2013/3113 on waste electrical and electronic equipment (WEEE)

This equipment comes under the provisions of the European Directive 2012/19/EU and UK Directive 2013 – S.I. 2013/3113 on waste electrical and electronic appliances (WEEE) and cannot be disposed as unsorted waste.

The equipment is labelled in accordance with the European Directive 2012/19/EU and UK directive 2013 – S.I. 2013/3113 with the crossed-out wheelie bin symbol.

At the end of life-time of the electric and electronic equipment (EEE) it must be taken to separate collection.

For more information contact your local waste authority, customer centre or the distributor.

12 Accessories

Table 11. Accessories

Description	Part number
Air inlet filter (Paper) CP 065B - CP 150B	178005A01
Air inlet filter (Paper) CP 300B	178005A02
Heavy duty inlet filter CP 065B - CP 150B	178005A03
Heavy duty inlet filter CP 300B	178005A04
G 1 1/4" outer silencer CP 065B - CP 300B	178005A05
NPT 1 1/4" outlet silencer CP 065B - CP 300B	178005A06
Liquid separator CP 065B, CP 150B, CP 300B	178005A08
Synchronisations tool for 65/150	10780150A00
Synchronisations tool for 300	10780300A00

P20050174A

EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Leybold GmbH
Bonner Strasse 498
D-50968 Köln
Germany

Documentation Officer
T: +49(0) 221 347 0
documentation@leybold.com

- *Product: Claw Vacuum Pump – motorized version and bare shaft version*
- *Modell: CLAWVAC CP 65B; CLAWVAC CP 100B; CLAWVAC CP 150B; CLAWVAC CP 200B; CLAWVAC CP 300B; CLAWVAC CP 400B*
- *Product family code:*
  - *Motorized version – with motor:*

10780065V01	CLAWVAC CP 65B 200/230V 50HZ 3Ph	10780150V07	CLAWVAC CP 150B 230/460V 60Hz 3Ph
10780065V02	CLAWVAC CP 65B 380V 60HZ 3Ph	17510150V00DGN	CLAWVAC CP 150B IE4 400V 50Hz 3Ph
10780065V03	CLAWVAC CP 65B 400V 50Hz 3Ph	17510150V01DGN	CLAWVAC CP 200B IE4 VSD ready 380-460V
10780065V04	CLAWVAC CP 65B 575V 60HZ 3PH	10780300V01	CLAWVAC CP 300B 230V 50HZ 3Ph
10780065V07	CLAWVAC CP 65B 230/460V 60Hz 3Ph	10780300V02	CLAWVAC CP 300B 380V 60HZ 3Ph
17510065V00DGN	CLAWVAC CP 65B IE4 400V 50Hz 3Ph	10780300V03	CLAWVAC CP 300B 400V 50Hz 3Ph
17510065V01DGN	CLAWVAC CP 100B IE4 VSD ready 380-460V	10780300V04	CLAWVAC CP 300B 575V 60HZ 3Ph
10780150V01	CLAWVAC CP 150B 200/230V 50HZ 3PH	10780300V07	CLAWVAC CP 300B 230/460V 60Hz 3Ph
10780150V02	CLAWVAC CP 150B 380V 60HZ 3PH	17510300V00DGN	CLAWVAC CP 300B 400V 50Hz 3Ph IE4
10780150V03	CLAWVAC CP 150B 400V 50Hz 3Ph	17510300V01DGN	CLAWVAC CP 400B IE4 VSD ready 380-460V
10780150V04	CLAWVAC CP 150B 575V 60HZ 3PH		

  - *Bare shaft version – without motor*

10780065V21	CLAWVAC CP 65B w/o motor 50HZ	10780150V22	CLAWVAC CP 150B w/o motor 60HZ
10780065V22	CLAWVAC CP 65B w/o motor 60HZ	10780300V21	CLAWVAC CP 300B w/o motor 50HZ
10780150V21	CLAWVAC CP 150B w/o motor 50HZ	10780300V22	CLAWVAC CP 300B w/o motor 60HZ

Is in conformity with the relevant Union harmonisation legislation:

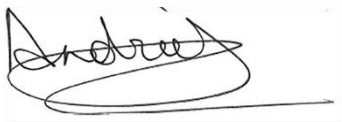
2006/42/EC	Machinery directive *Note: The safety objectives of the Low Voltage Directive 2014/35/EU were complied with in accordance with Annex 1 No. 1.5.1 of this directive.*
2011/65/EU	Restriction of certain hazardous substances (RoHS) directive as amended by Delegated Directive (EU) 2015/863

Based on the requirements of relevant harmonised standards and technical documentation:

EN 1012-2:1996 +A1:2009	Compressors and vacuum pumps. Safety requirements. Vacuum pumps
EN 60204-1:2018	Safety of machinery. Electrical equipment of machines. General requirements
EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

This declaration, based on the requirements of the listed Directives and EN ISO/IEC 17050-1, covers serial numbers after 02.01.2024

You must retain the signed legal declaration for future reference
This declaration becomes invalid if modifications are made to the product without prior agreement.



Andries De Bock –Vice President Engineering
Industrial Vacuum Division, Cologne

René Rose Stueber – General Manager PC Cologne
Industrial Vacuum Division, Cologne

P20050174A

Declaration of Conformity

Leybold GmbH
Bonner Strasse 498
D-50968 Köln
Germany

Documentation Officer
Innovation Drive
Burgess Hill
West Sussex
RH15 9TW
documentation@leybold.com

This declaration of conformity is issued under the sole responsibility of the manufacturer.

- *Product: Claw Vacuum Pump – motorized version and bare shaft version*
- *Modell: CLAWVAC CP 65B; CLAWVAC CP 100B; CLAWVAC CP 150B; CLAWVAC CP 200B; CLAWVAC CP 300B; CLAWVAC CP 400B*
- *Product family code:*
  - *Motorized version – with motor:*

10780065V01	CLAWVAC CP 65B 200/230V 50HZ 3Ph	10780150V07	CLAWVAC CP 150B 230/460V 60Hz 3Ph
10780065V02	CLAWVAC CP 65B 380V 60HZ 3Ph	17510150V00DGN	CLAWVAC CP 150B IE4 400V 50Hz 3Ph
10780065V03	CLAWVAC CP 65B 400V 50Hz 3Ph	17510150V01DGN	CLAWVAC CP 200B IE4 VSD ready 380-460V
10780065V04	CLAWVAC CP 65B 575V 60HZ 3PH	10780300V01	CLAWVAC CP 300B 230V 50HZ 3Ph
10780065V07	CLAWVAC CP 65B 230/460V 60Hz 3Ph	10780300V02	CLAWVAC CP 300B 380V 60HZ 3Ph
17510065V00DGN	CLAWVAC CP 65B IE4 400V 50Hz 3Ph	10780300V03	CLAWVAC CP 300B 400V 50Hz 3Ph
17510065V01DGN	CLAWVAC CP 100B IE4 VSD ready 380-460V	10780300V04	CLAWVAC CP 300B 575V 60HZ 3Ph
10780150V01	CLAWVAC CP 150B 200/230V 50HZ 3PH	10780300V07	CLAWVAC CP 300B 230/460V 60Hz 3Ph
10780150V02	CLAWVAC CP 150B 380V 60HZ 3PH	17510300V00DGN	CLAWVAC CP 300B 400V 50Hz 3Ph IE4
10780150V03	CLAWVAC CP 150B 400V 50Hz 3Ph	17510300V01DGN	CLAWVAC CP 400B IE4 VSD ready 380-460V
10780150V04	CLAWVAC CP 150B 575V 60HZ 3PH		

  - *Bare shaft version – without motor*

10780065V21	CLAWVAC CP 65B w/o motor 50HZ	10780150V22	CLAWVAC CP 150B w/o motor 60HZ
10780065V22	CLAWVAC CP 65B w/o motor 60HZ	10780300V21	CLAWVAC CP 300B w/o motor 50HZ
10780150V21	CLAWVAC CP 150B w/o motor 50HZ	10780300V22	CLAWVAC CP 300B w/o motor 60HZ

The object of the declaration described above is in conformity with relevant statutory requirements:

Supply of Machinery (Safety) Regulations 2008
The objectives of the Electrical Equipment (Safety) Regulations 2016 are governed by Annex 1 1.5.1 of this regulation.

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Relevant designated standards or technical specifications are as follows:

EN 1012-2:1996 +A1:2009	Compressors and vacuum pumps. Safety requirements. Vacuum pumps
EN 60204-1:2018	Safety of machinery. Electrical equipment of machines. General requirements
EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

This declaration, based on the requirements of the listed Statutory Instruments and EN ISO/IEC 17050-1, covers serial numbers after 02.01.2024

You must retain the signed legal declaration for future reference

This declaration becomes invalid if modifications are made to the product without prior agreement.

Signed for and on behalf of Leybold GmbH

Andries De Bock –Vice President Engineering
Industrial Vacuum Division, Cologne

René Rose Stueber – General Manager PC Cologne
Industrial Vacuum Division, Cologne

ADDITIONAL LEGISLATION AND COMPLIANCE INFORMATION

EMC (EU, UK): Industrial equipment

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

RoHS (EU, UK): Material Exemption Information

This product is compliant with the following Exemptions
Annex III:

- 6(a) **Lead** as an alloying element in steel for machining purposes and in galvanised steel containing up to 0.35 % lead by weight
- 6(b) **Lead** as an alloying element in aluminium containing up to 0.4% by weight
- 6(c) Copper alloy containing up to 4% **lead** by weight

REACH (EU, UK)

This product is a complex article which is not designed for intentional substance release. To the best of our knowledge the materials used comply with the requirements of REACH. The product manual provides information and instruction to ensure the safe storage, use, maintenance and disposal of the product including any substance based requirements.

Article 33.1 Declaration (EU, UK)

This product contains Candidate List Substances of Very High Concern above 0.1%ww by article as clarified under the 2015 European Court of Justice ruling in case C-106/14.

- 1,2-dimethoxyethane (EDGME)
  This substance is sealed within the case of the compact lithium coin cell battery and is essential to the long life and reliable performance of the battery.
- Cadmium (Cd)
  This substance is present in electrical contacts.
- Lead (Pb)
  This substance is present in certain steel / aluminium / brass components.

TSCA PBTs (US)

Regulation of Persistent, Bioaccumulative, and Toxic Chemicals Under TSCA Section 6(h)
The product does not knowingly or intentionally contain substances in contravention with the above requirements.

Additional Applicable Requirements

The product is in scope for and complies with the requirements of the following:

2012/19/EU	Directive on waste electrical and electronic equipment (WEEE)

材料成分声明
China Material Content Declaration

	有害物质 Hazardous Substances					
部件名称 Part name 	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr VI)	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
铸铝及铝合金制品 Aluminium alloys	X	O	O	O	O	O
钢合金制品 Steel alloys	X	O	O	O	O	O
铜接头 Brass connectors	X	O	O	O	O	O

O: 表示该有害物质在该部件的所有均质材料中的含量低于 GB/T 26572 标准规定的限量要求。
O: Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: 表示该有害物质在该部件的至少一种均质材料中的含量超出 GB/T26572 标准规定的限量要求。
X: Indicates that the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T26572.

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Leybold

Pioneering products. Passionately applied.

Leybold GmbH
Bonner Strasse 498
50968 Cologne
GERMANY
+49-(0)221-347-0
info@leybold.com
www.leybold.com