USER MANUAL

VACUUM PUMP

VP Series

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1. GENERAL INFORMATION

In many industries the application of innovative technical products results in large cost savings and higher production output. InClaTec B.V. is specialized in developing and producing innovative high-tech clamping devices which can be applied as standard.

1.1 Introduction

This user manual is a support how to use your new product. It's recommended to read this document fully. For further information please contact InClaTec B.V.

This user manual is a part of the supply and should be kept in a safe place while using the vacuum pump. There must be a copy available for those working with this system. It's the intension that this manual should also be transferred to the eventual new owner of the vacuum pump.

Treat this instruction carefully. It isn't allowed to change or delete pages. InClaTec B.V. reserves the right to replace parts of this guide, in the context of product improvement, at any time without directly providing a new edition.

All drawings and/or pictures in this manual are not binding. These drawings and/or pictures may differ from the actual situation. InClaTec B.V. isn't responsible for any misunderstandings regarding the drawings and/or pictures.

1.2 Staff

Certain operations can only be operated or made by qualified or trained staff. For the description of the qualification level the following standard features are used:

- The qualified staff must have sufficiently technical knowledge and/or work experience to be able to recognize and prevent potential danger (engineers and technicians).

- The staff must be adequately trained and/or controlled by the qualified staff to identify and prevent the potential danger (the operated and maintenance staff). They should have the following qualifications:

    1. They must be trained to operate the product safely. They must be capable to operate the equipment according to standard safety regulations.
    2. They must maintain the product and use the safety devices as described in this manual.

The customer and/or user is/are required to make sure, before using the QuickChange Module:

- that the staff has read and understood this manual.
- that the staff follows the instructions as given in this manual.

1.3 Individual Means Of Protection

The staff, mentioned in the previous section, must wear protecting clothing which is necessary during operating of the machine, on which the vacuum pump has been assembled.

Safety shoes are required. The need for wearing hearing protection, eye protection and a helmet can be defined by the user.

It isn't allowed to wear clothing that can get caught in moving machine parts.

1.4 General Safety Instructions

The following provisions and recommendations are primarily based on observing the rules of the safety regulations mentioned in this manual.

InClaTec B.V. isn't responsible for possible damage to persons or goods related to ignoring of the safety regulations and instructions in this manual.

Transportation, installation, operation and maintenance of the vacuum pump can only be performed by the staff which meets the conditions described in the previous section.

1.5 Emergency Situation

In an emergency situation, it's advised to apply the methods of the operating and maintenance manual of the machine where the vacuum pump is mounted.

In an emergency situation there must be measures taken which cause no danger to persons or goods.

In case of fire there should be ensured that the vacuum pump isn't connected to the electrical system by taking action.

The pump must be disconnected when there is damage to the equipment. Keep moisture away from live parts. Moisture can cause short circuits.

Repairs and work on electrical installations may only be performed by a qualified electrician.

Oil mist can be dangerous to your health. Therefore:
- Always wear safety glasses and mouth cap while working on the oil system.
- Ensure good ventilation.

Ensure that hot surfaces cannot be touched. Touching hot surfaces can cause severe burns.

Improper use environmentally hazardous substances can cause serious damage to the environment.

1.6 Operational Restrictions

The vacuum pump may only be used for applications described in this manual. In addition, it may only be used in connection with the InClaTec B.V. recommended and approved parts.

Consequences of the use of the vacuum pump in other applications aren't the responsibility of InClaTec B.V. in any way whatsoever. For the right application area you can contact InClaTec B.V.

The modular vacuum motor is designed and constructed for the creation of a vacuum by air and / or non-aggressive, non-toxic and non-explosive gases in a hazardous environment.

Any use beyond the scope of the intended use and / or use of the equipment can lead to dangerous situations for other purposes. Therefore:
- Make sure the equipment is used only for the intended purposes.
- Strictly observe all instructions in this guide.
- The list of abuses of use are limited to the following points:
  - Sucking in solids.
  - Sucking in aggressive, toxic and explosive gases.
  - Changes or alterations to the equipment in any form.

All claims for damage caused by not intended use are not allowed. Here is the owner / manager responsible for.

1.7 Marking

The symbols and labels shown below are applied to the vacuum pump by the manufacturer. They always refer to their immediate surroundings. The labels, symbols, etc. may not be removed under any circumstances.

Unreadable labels, symbols, etc. can lead to danger. They can be dirt, or illegible over time. Therefore:
- Labels, symbols, etc. shall be clearly legible.
- Damaged labels, symbols, etc. should be replaced. For this, we advise you to contact InClaTec B.V.

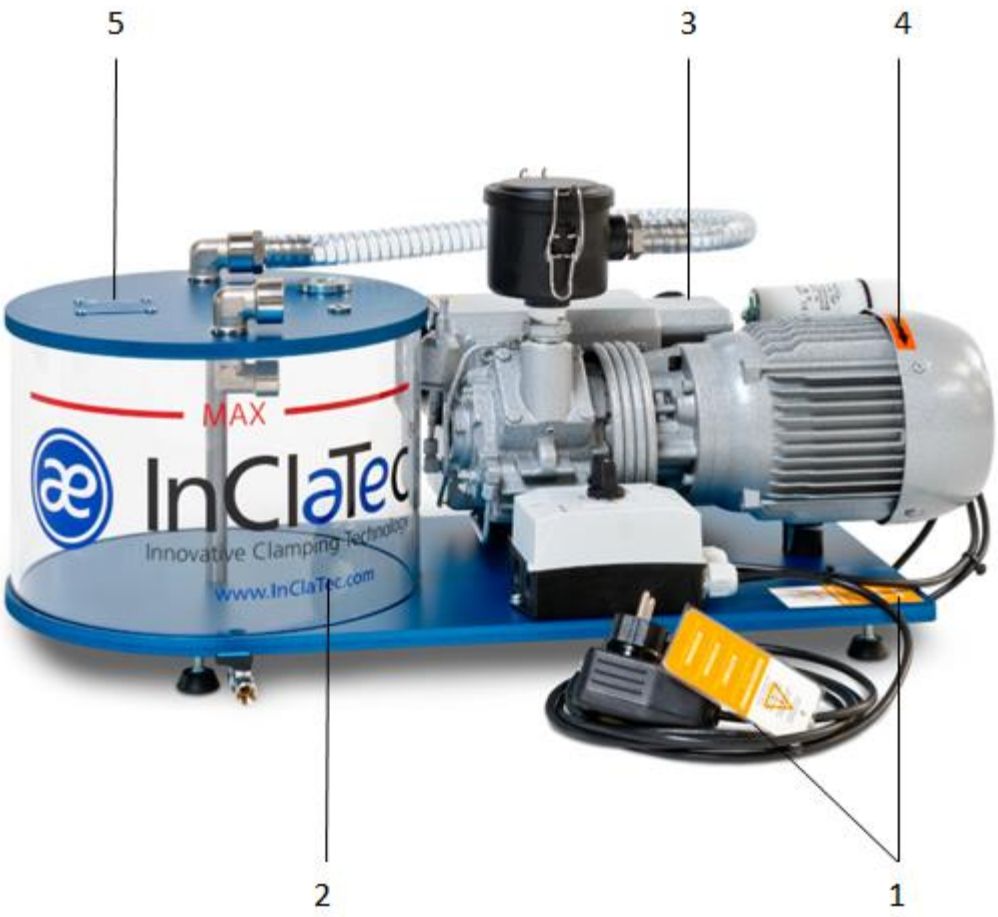
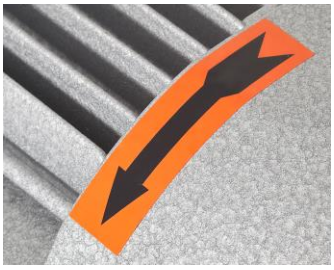


Figure1.7.1
Overview of a vacuum pump

1. Read the manual before use! WARNING! Refill oil.
(Sticker + Label)

2. Maximum filling level

3. Pay attention! Hot surfaces.



4. Direction of rotation Arrow

5. Type plate

1.8 Transport

Before shipment each vacuum pump has been examined and checked thoroughly. Check at reception of the goods the integrity and the contents of the package to ensure that nothing has been damaged during the transport. Check also if the delivery correspondents to the order.

When unloading should carefully be made to the equipment.

Immediately report any defects or damage to InClaTec B.V. and the carrier is liable for damage during transportation.

A reclamation against any defects or damage must be made within 10 days after receipt of the goods.

2. DESCRIPTION OF THE VACUUM PUMPS

2.1 Technical Data

	Unit	VP00_10	VP00_16	VP00_21	VP00_22	VP00_63
Sound Pressure Level	[dB (A)]	64	66	66	66	64
Voltage	[V~]	230	230	230	400	400
Motor capacity	[kW]	0,37	0,55	0,75	0,75	2
Nominal suction capacity	[m³/h]	10	16	20	20	63
Ultimate pressure	[hPa (mbar)]	2	2	20,0	20,0	0,1
Max. vacuum	[%]	99,5	99,5	98	98	99,9
Oil quantity	[l]	0,3	0,3	0,45	0,45	2,0
Oil	N/A	VM032	VM032	VM032	VM068	VM100

VP001 Series: Loose oil lubricated rotary vane vacuum pump which is characterized by its reliability and robust construction. The vacuum pump is maintenance-friendly. This pump is supplied without electricity cables and other accessories.

Type	Order no.
VP00110	2050.0110
VP00116	2050.0116
VP00121	2050.0121
VP00122	2050.0122
VP00163	2050.0163

Figure 2.1.1
VP00121

VP003 Series: Complete oil lubricated rotary vane vacuum pump as the VP001 series incl. an air filter housing with exchangeable air filter, electric cable, electric plug with motor protection and a vacuum spiral hose set.

Type	Order no.
VP00310	2050.0310
VP00316	2050.0316
VP00321	2050.0321
VP00322	2050.0322
VP00363	2050.0363

Figure 2.1.2
VP00321

VP005 Series: Complete oil lubricated rotary vane vacuum pump as the VP001 series incl. a liquid separator, an air filter housing with exchangeable air filter, electric cable, electric plug with motor protection. The vacuum pump can be used for vacuum clamping with the use of liquids such as cooling emulsion during processing.

Type	Order no.
VP00521	2050.0521
VP00522	2050.0522

Figure 2.1.3
VP00521

VP007 Series: Complete oil lubricated rotary vane vacuum pump as the VP001 series incl. a liquid separator, a vacuum switch, an air filter housing with exchangeable air filter, electric cable, electric plug with motor protection. The vacuum pump can be used for vacuum clamping with the use of liquids such as cooling emulsion during processing.

The vacuum switch turns on the pump at a set vacuum which is present in the liquid separator and switches the pump automatically off at a vacuum of 5% above the set vacuum.

Type	Order no.
VP00721	2050.0721
VP00722	2050.0722

Figure 2.1.4
VP00721

2.2 Oil

Denomination	**VM032**	**VM068**	**VM100**
ISO-VG	32	68	100
Base	Mineral Oil	Mineral Oil	Mineral Oil
Density [g/cm³]	0,872	0,884	0,888
Ambient temperature range [ºC]	5…30	5…30	12…30
Kinematic viscosity at 40 ºC [mm²/s]	30	68	110
Kinematic viscosity at 100 ºC [mm²/s]	5	8,5	11,5
Flashpoint [ºC]	225	235	260
Pour point [ºC]	-15	-15	-15
Filling quantity	See table above	See table above	See table above

2.3 Overview of the vacuum pump

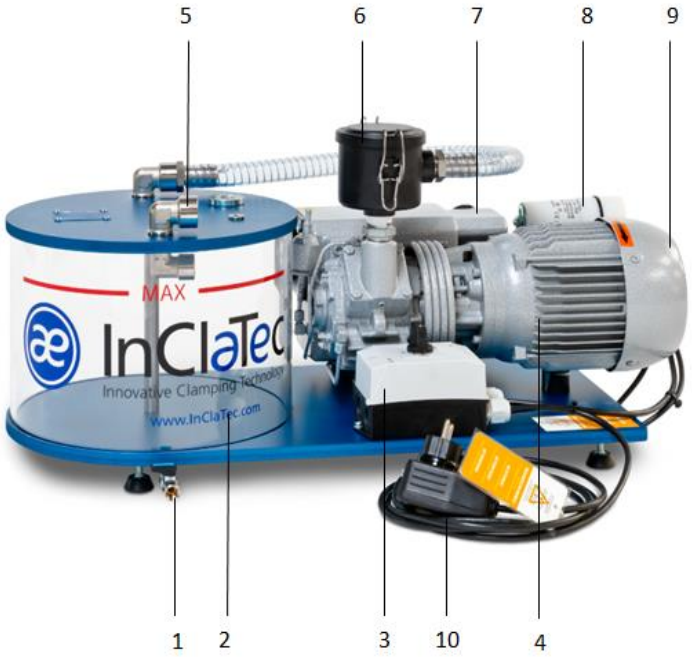


Figure 2.3.1
VP00821

1. Drain valve
2. Liquid separator
3. Electrical switch
4. Vacuum pump
5. Hose connection
6. Air filter
7. Oil separator
8. Capacitor
9. Ventilation cap
10. Plug with motor protection

** The vacuum pump on figure 3.1.1 may differ from your pump as there are many different types.*

Short description:
Air or gas is drawn in and flows through the hose connection to the liquid separator. Via the liquid separator it will go through an air filter to the vacuum pump. Eventually, the sucked air is released into the atmosphere by the outlet of the separator.

2.4 Components

Vacuum pump

The vacuum pump works according to the principle of rotary slide. A round rotor is positioned in the center of the shaft of the vacuum pump. The axis of the vacuum pump is driven by the drive motor via a flexible coupling.

The rotor rotates at the same time in a round, solid cylinder, the axis of which is shifted relative to the center line of the rotor, in such a way that the rotor and the inside of the cylinder almost touch one another along in a line. Sliding slide in slots in the rotor, so that there arise separated chambers in the space between the rotor and the cylinder. At the same time, air is sucked and pressed away. Therefore, the vacuum pump is virtually pulsation.

In order to prevent the suction of the vacuum pump solid particles is provided with a strainer in the suction connection.

In order to prevent the vacuum pump rotating the wrong way after switching off, the vacuum pump is provided with a non-return valve.

Figure 2.4.1
VP00121/VP00122

Liquid Separator

Because of the liquid separator the sucked medium is separated from the liquid volume before it enters the compression chamber of the pump. The liquid can be released with the drain valve at the bottom of the liquid separator. It must be emptied before the stated maximum level is reached. The motor will suck water when the maximum level is exceeded. Because of this the air filter will be moist so the warranty expires.

Figure 2.4.2
Liquid Separator VA050

Air filter
The air filter ensures that there goes no solid particles to the compression chamber of the pump.

Figure 2.4.3
Air filter housing VA052

Figure 2.4.4
Air filter VA053

Vacuum spiral hose set (which comes with the VP003 Series)
Complete vacuum spiral hose set including vacuum wire spiral hose, 3/2 way air valve, vacuum gauge, quick coupling and a plug.

Figure 2.4.5
Vacuum spiral hose set
VA001

Plug with motor protection
Plugs with motor protection. These plugs switch the motor of the vacuum pump off when it is overloaded. The plug in figure 2.4.6 is attached to vacuum VP00_21 (230V). Figure 2.4.7 shows the plug that is mounted to vacuum VP00_22 (400V).

Figure 2.4.6
Plug with motor protection
VP00_21

Figure 2.4.7
Plug with motor protection
VP00_22

3. INSTALLION AND COMMISSIONING

3.1 Installation

The equipment must be installed in a hazardous area on a flat, horizontal surface. There may no sensitive parts come into contact with the hot surfaces of the vacuum pump. When possible, these hot surfaces should be covered so that no one can be hurt. The vacuum pump generates heat and exhaust air during use, so there is sufficient ventilation must be present.

Operations after installation

1. Make sure that the oil drain plug (A) is in place (tight).
2. Remove the oil filler plug (B) using a wrench.
3. Fill pump with proper oil (see section 2.2). Through the inspection glass (C) you can determine the oil level.
4. Return the oil filling plug (B) using a key.
5. Connect the vacuum intake hose to the hose connection.
6. Plug in the power supply.
7. For models with a 400 V connection must be checked whether the vacuum pump is running in the right direction. Turn on the appliance for a moment and compare the direction of the rotor with the direction of the arrow on the fan cover.

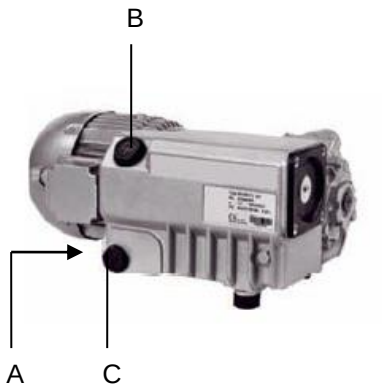


Figure 3.1.1

Operations before each use

1. Check all connections.
2. Check the oil level. It may not exceed min./max. the position of the inspection glass.
3. Check the fluid level in the moisture separator. It must not exceed the indicated maximum height.
4. After these operations have been found to be good, the vacuum pump can be used.

4. TROUBLESHOOTING

The next chapter contains possible causes for failures. It is also described how the potential problem can be fixed. The maintenance interval should be shortened as you continue to experience interference. If the fault cannot be rectified by following the instructions described below, there should be taken contact InClaTec B.V.

Solving of the problems such as described below can be carried out by the operating staff, unless otherwise indicated. A portion of the operations to be performed by specialists or even by the staff of the manufacturer (InClaTec B.V.).

Failure	**Possible Problem**	**Problem Solving**	**By doing:**
The vacuum pump has insufficient vacuum or suction	The vacuum system or the suction pipe is not leak-proof	Check the hose and / or pipe connections for possible leaks	Operator
	The oil level is too low	Add oil (see section 4.1)	Operator
	contaminated oil	Change the oil	Operator
	seal leaks	Replace seal	Operator
	Oil pipes are broken or leaking The oil return suction line is broken	Tighten the connections Replace the connections and / or pipes	Operator
	Wall sealing leaks	Replace wall sealing	Operator
	Air filter is clogged	Clean air filter, replace if necessary	Operator
	Supply hose leaks	Replace supply hose	Operator
Pump is getting very hot (Normal temperature is 80 to 90 ºC)	Inadequate cooling or ventilation	Provide more ventilation	Operator
	Grill of the fan is dirty	Clean and blow with air	Operator
	Cooling fins on the pump house are dirty	Clean cooling fins	Operator
	Too high oil level	Drain oil to normal level	Operator
	Oil exhaust filter is clogged	Replace oil mist filter cartridge	Operator
Vacuum pump leaking oil	Screws have come loose	Retrace screws and tighten	Operator
	Oil seals damaged	Replace oil seals	Manufacturer
	Oil exhaust filter is clogged	Replace oil mist filter cartridge	Operator

Failure	Possible Problem	Problem Solving	By doing:
Leakage of oil or oil mist	Pump is tilted and there is oil on the inside	Run the pump for 2 min. with valve half open	Operator
	Wrong oil type	Proper oil use, see section 2.2	Operator
	Oil exhaust filter is clogged	Replace oil mist filter cartridge	Operator
Pump is not working and the engine hums, protective switch turns on after a few moments	Engine only runs with two stages	Check the power supply and all fuses	Electrician
	Protective switch is set too sensitive	Readjust protective switch	Electrician
	Power problem	Check power supply	Electrician
	Cable section too small	Use a larger cross-section	Electrician
Vacuum pump is slow after switch	Direction of rotation is wrong	Change direction of rotation	Electrician
	Too high oil level	Drain oil to normal level	Operator
	Wrong oil type	Proper oil use, see section 2.2	Operator
	Ambient temperature is too low	Do not work under the +12 ºC	Operator
	Pump has endured several weeks	Let the pump run, if necessary turn off between several times	Operator
	Oil has not been replaced in a while	Drain all the oil. Filling with a mixture of 50% oil and 50% of kerosene (or diesel). Run the pump for 30 minutes. Remove mixture, replace oil filter and fill with the correct oil.	Operator
Pump falters, the engine does not pull through	Pump has been running without oil	Contact manufacturer	Manufacturer
	Foreign object is drawn and damaged the blades	Replace blades	Manufacturer
	Check valve is leaking or blocked (oil is drawn into the compression chamber when the pump is turned off)	Replace suction module and check valve	Manufacturer
Electric motor runs but the pump does not work	Coupling ring between pump and motor has been moved or disconnected	Replace coupling ring	Manufacturer

Oil in the equipment is:

Failure	**Possible Problem**	**Problem Solving**	**By doing:**
Black	Oil has not been replaced in a while	Drain all the oil. Filling with a mixture of 50% oil and 50% of kerosene (or diesel). Run the pump for 30 minutes. Remove mixture, replace oil filter and fill with the correct oil.	Operator
Diluted and / or whitish color	Water or large amounts of humidity are sucked		
From the wrong viscosity (which means sticky, resinous etc.)	Wrong oil type		

5. MAINTENACE

5.1 Introduction

The appropriate maintenance is important for a long service life of the vacuum pump and its components, and functional under good conditions. It also ensures sufficient long-term reliability.

5.2 Safety During Maintenance

The maintenance work of the vacuum pump requires a few conduct rules, namely:

- All maintenance must be performed by qualified staff (see section 1.2).

- Maintenance must be performed when the equipment is energized. The entire operating and maintenance staff must adhere strictly to the rules for prevention of equipment accidents.

- Allow to cool hot surfaces.

- Always wear safety shoes, protective clothing and other necessary equipment. During maintenance work do not wear jewelry or loose clothing.

- Use only original parts for proper operation of the equipment.

- Don’t use abrasive or corrosive materials or solvents when cleaning the vacuum pump. Don’t use cleaning materials that damage the seals and cause / or corrosion.

5.3 Maintenance Schedule

Daily maintenance:

- Check the level and color of the oil

Weekly maintenance:

- Check the vacuum pump oil leaks. In case of leakage repair the vacuum pump.

Monthly maintenance:

- Check the operation of the oil mist filter cartridge.
- Check the engine air filter, replace if necessary.

Every 6 months:

- Make sure the housing is free of dust and dirt, clean if necessary.
- Clean the fan, the fan wheel, the front grill and the cooling fins.

Annually:

- Replace oil mist filter cartridge.
- Replace the air filter inlet.
- Check the inlet strainer, clean it if necessary

Each 500 - 2000 operating hours:

- Change the oil.

Maintenance Set:
A maintenance set for a vacuum pump is composed of: an air filter, an oil mist filter cartridge, vacuum oil, and various O-rings. We encourage you to have a maintenance set in stock to do the right maintenance at the right time.

Figure 5.3.1
Vacuum hose set VA058

5.4 Maintenance Activities

Figure 5.4.1

Change oil
- Turn of the equipment.
- Place a container under the drain hole.
- Remove the drain plug (C) and drain the oil.
- Put the drain plug back (C) when the oil flow reduces.
- Turn on the vacuum pump for a few seconds.
- Ensure that the vacuum pump is turned off.
- Remove the drain plug (C) and drain the remaining oil.
- Make sure the sealing is undamaged and placed on the drain plug (C), replace if necessary.
- Place the drain plug (C) back together with the sealing ring.
- Open the oil filter plug (B) using a key.
- Fill the vacuum pump with the appropriate compression oil to 75% of the level through the inspection glass.
- Make sure the sealing is undamaged and placed on the oil fill plug (B), replace if necessary.
- Place the oil filter plug (B) back together with the sealing ring.

Figure 5.4.2

Replacement of the oil filter cartridge

- Turn off the equipment.
- Remove the outlet cover from the oil filter separator.
- Loosen the screw in the center of the filter spring, but don't remove it yet.
- Press the filter spring from the deepening and twist it.
- Remove the filter spring from the oil filter separator.
- Pull the oil filter cartridge from the oil filter separator.
- Insert a new oil filter cartridge, such that the opening is properly positioned in the seat in the oil filter separator.
- Make sure that the end of the screw in the middle of the filter spring about 2-5 of threads extending from the filter spring.
- Place the filter spring in such a way that the ends by the projections get stuck in the seats in the oil filter separator and that the end of the screw in the seat is falling from the oil filter cartridge.
- Tighten the screw so far stuck in the filter spring, until the screw head touches the spring steel.
- Make sure that the seal under the outlet cover is clean and undamaged, replace seals if necessary.
- Install the exhaust cover together with the seal and hex bolts on the oil filter separator.

* The situation as shown in figure 5.4.2 may differ from your situation.

Replacing the air filter

- Turn off the equipment.
- Snap the two latches that sit on the air filter box.
- Remove the air filter.
- Insert the new air filter into the air filter, and then the two latches again.

Figure 5.4.3
Air filter housing VA052

Figure 5.4.4
Air filter VA053

Figure 5.4.5

Fan house cleaning
- Turn off the equipment.
- Loose the screws of the fan cap and remove it.
- Clean the cap with blowing air
- Turn the cap back on his place and tighten the screws.

* The situation as shown in figure 5.4.5 may differ from your situation.

Figure 5.4.6
Drain tap VA01201

Draining fluids
- Turn off the equipment.
- Place a container under the drain valve.
- Turn on the tap and drain the liquid from the liquid separator.
- Shut off the drain valve when the liquid separator is empty.

5.5 Storage

When the vacuum pump is stored then the following points must be made:

- Ensure that the section port and the gas outlet are closed.
- Store the vacuum pump in the original packaging as possible.
- Store the vacuum pump inside, dry and dust-free.

6. EC-DECLARATION OF CONFORMITY

This Declaration of Conformity and the CE mark on the name plate are valid for the vacuum pump which is part of the InClaTec delivery. When this vacuum pump is incorporated into a larger system, the manufacturer of this system carry out the conformity assessment process for this greater system of Machinery Directive 2006/42 / EC, submit their Declaration of Conformity and the system features the CE marking.

CE

We

InClaTec B.V.
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The Netherlands

Declare that all vacuum pumps (indicated in section 2.1) are

In accordance with the EU Directives:
- "Machines" 2006/42 / EC
- "Electrical Equipment Designed for Use within Certain Voltage Limits" (so called "Low Voltage Directive") 2006/95 / EC
- "Electromagnetic compatibility" 2004/108 / EC

designed and manufactured according to the following standards:
- DIN EN ISO 12100-1 / -2 Safety of Machinery - General Design Principles, Part 1 and 2
- DIN EN 60204 Safety of Machinery - Electrical equipment of machines

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