

## VARODRY VD65/ VD100/ VD160/ VD200

Operating instructions 300766038\_002\_C1

Part No.

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## Safety and compliance

- 1 Safety and compliance
- 1.1 Definition of Warnings and Cautions

#### NOTICE:

Obligation to Provide Information

Read and follow these instructions carefully before installing and commissioning to ensure optimum and safe operation right from the start.



Safe and proper operation is guaranteed when used correctly and in accordance with the instructions contained in these operating instructions. Please read all safety instructions in this section and the rest of this manual carefully and make sure that these instructions are followed. The device may be operated and maintained only by trained personnel in the proper condition and as described in the operating instructions. Also observe local and state requirements and regulations. If you have any questions regarding safety, operation or maintenance of the device, please contact our nearest subsidiary.



#### DANGER:

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



#### WARNING:

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



#### CAUTION:

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



#### NOTICE:

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

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

Keep the instructions for future use.

## **Important Safety Information**

#### 2 Important Safety Information

Pressures given in bar or mbar are absolute values. If exceptionally a gauge pressure is meant, a "g" is added (for example, bar (g)).

#### 2.1 Mechanical Hazards

- 1. Avoid exposing any part of the human body to the vacuum.
- 2. Select a secure place for the appliance (level surface).
- 3. Never operate the pump without a connected intake line or without fitting a blank flange.
- 4. The discharge port of the pump must not be blocked or constricted. Never operate the pump with a seal-off stopper in place blanking off the exhaust port. Operate the pump only with a connected vacuum system to the intake flange.
- 5. With a closed exhaust pipe, the pump can generate up to 1.5 bar (g) overpressure on the exhaust. The exhaust pipes should be laid out accordingly.
- 6. Condensates from the pump can collect inside or at the exhaust, escape and spill onto the floor, when operating the pump without an exhaust line or during transport with an exhaust being not blanked off. In this case there exists the risk of slipping.
- 7. Take note of the labelling of inlet and outlet. A mix-up can lead to dangerous buildup of pressure in the vacuum system or in the system. After each change of the electrical connection, check the pump's rotational direction.
- 8. In case of power supply outage, the vacuum system is ventilated by the pump. If this is not wanted, install a non-return valve at the inlet.
- 9. After a loss of power, the pump restarts independently. If this is not wanted, install a restart inhibitor.
- 10. Do not operate the pump with any of the covers removed. This may result in serious injury.



#### WARNING:

When rotated in the wrong direction, the pump will generate up to 4.5bar (g) pressure at the inlet. If a vacuum system is connected, the pressure build up can lead to explosion of the system.

#### 2.2 Electrical Hazards

- 1. Housing parts must not be removed.
- 2. The electrical connection must only be provided by a trained person. Obey the national regulations in the country of use like EN 50110-1 for Europe.
- 3. Note the information on the IP type of protection.

#### DANGER:



After a mains power failure the pump will run up automatically again. This also applies in the case of an emergency shut-down. In order to prevent the pump from running up automatically again, the pump must be integrated within a control arrangement such that it can only be switched on manually again after the mains power has returned.

## **Important Safety Information**

#### 2.3 Thermal Hazards



#### CAUTION:

The surface of the pump may attain temperatures over 80 °C. There is the risk of burn injury.

1. Before servicing and maintenance work, always leave the pump to cool down.

#### 2.4 Hazards Caused by Materials and Substances



#### DANGER:

Before commissioning the pump, make sure that the media which are to be pumped are compatible with each other so as to avoid hazardous situations. Observe the instructions for proper and improper use of the pump in Conforming Use.

#### 2.5 Noise Hazard

#### CAUTION:



The noise level of the pump during ultimate pressure operation corresponds to the values stated in the technical data. In other operating modes and depending on the connected vacuum system, higher values can be expected. Make sure that suitable protection measures are taken to protect your hearing.

#### 2.6 Risk of Damaging the Pump

- 1. Before starting up for the first time, the motor circuit must be equipped with a suitable protective motor switch. Please take note of the information in these Operating Instructions and on the electric motor (wiring diagram).
- 2. Do not allow the ingestion of objects (screws, nuts, washers, pieces of wire, etc.) through the inlet port. If required, use an inlet filter.
- 3. Do not use the pump for applications that produce abrasive or adhesive powders or condensible vapors that can leave adhesive or high viscosity deposits. When planning to pump vapors other than water vapor please contact our sales or service department for advice.
- 4. This pump is suited for pumping water vapor within the specified water vapor tolerance limits.
- 5. Avoid vapors that can condense into liquids when being compressed inside the pump, if these substances exceed the vapor tolerance of the pump.
- 6. In the case of wet processes we recommend the installation of liquid separators upstream and downstream of the pump as well as the use of the gas ballast.
- 7. The exhaust line should be laid so that it slopes down and away from the pump so as to prevent condensate from back streaming into the pump.
- 8. Avoid the entry of particles and fluids.
- 9. The air intakes of the pump and the motor must remain free.

## Description

#### **3 Description**

The VARODRY is a dry-compressing vacuum pump and can evacuate containers in the rough vacuum range.

The pump is connected to a 3-phase network on the motor terminal board and operated directly from the mains. It is air-cooled and requires minimum maintenance.

#### 3.1 Supplied Equipment

The pump is delivered ready for operation. Intake and exhaust flanges are covered with caps.

#### 3.2 Technical Data

#### Table 1 Technical data

VARODRY	65	100	160	200
Maximum pumping speed without gas ballast	65 m <sup>3</sup> /h	105 m <sup>3</sup> /h	150 m <sup>3</sup> /h	200 m <sup>3</sup> /h
Ultimate pressure without gas ballast		0.01	mbar	
Maximum permissible inlet pressure		1200	mbar	
Maximum permissible discharge pressure (Relative to ambient) <sup>5)</sup>		200	mbar	
Water vapor tolerance with gas ballast <sup>4)</sup>		20/60	) mbar	
Water vapor capacity with gas ballast <sup>4)</sup>	0.8/2 kg/h	1.2/3.1 kg/h	11.9/5.1 kg/h	2.4/6.7 kg/h
Permissible ambient temperature		0 to +	-40 °C	
Storage temperature		-20 to	+60 °C	
Noise level without external silencer, at ultimate pressure (50/60 Hz, according to DIN EN ISO 2151)	64/67 dB(A)	64/67 dB(A)	70/72 dB(A)	70/72 dB(A)
Relative ambient atmospheric humidity		95%, non-	condensing	
Max. Installation height <sup>1)</sup>		Up to 1000 m	above sea level	
Cooling		A	Air	
Mains voltage 50 Hz versions <sup>2)</sup>		400 V+/-10% d	or 200 V+/-10%	
Mains voltage 60 Hz versions <sup>2)</sup>		460 V+/-10% d	or 230 V+/-10%	
		380 V+/-10% d	or 200 V+/-10%	
Phases		3-	ph	
Max. Current 50 Hz versions 200/400 V 3)	6.4/3.2 A	8.6/4.3 A	12.6/6.3 A	17.0/8.5 A
Max. Current 60 Hz versions 230/460 V 3)	5.6/2.8 A	7.6/3.8 A	10.6/5.3 A	14.8/7.4 A
Max. Current 60 Hz versions 200/380 V 3)	6.0/3.4 A	8.3/4.6 A	12.8/6.9 A	16.9/10.0 A
Max. Power consumption	1500 W	2200 W	3000 W	4000 W
Permissible motor speed <sup>2)</sup>		50/6	60Hz	
Protection class		IP	55	
Intake connection		G	2"	
Discharge flange DN		G 1	1/2"	
Weight (approximate)	105 kg	115 kg	130 kg	140 kg

1) Please inquire for installation heights above 1000 m.

2) Depending on version 50 or 60Hz. Please see pump nameplate.

3) Motor protective switch must be suitable for operation with IE3 motors.

4) Depending on installed configuration. Please see chapter purge gas for details.

## Description

5) Up to 200 mbar possible depending on the inlet pressure of the pump. Please consult Leybold if 50 mbar is exceeded



#### Figure 1. Dimensional drawing (mm)

1. Optional inlet position

Variable dimensions	<b>VD65</b>	VD100	VD160	VD200
А	773	865	402	153
В	670	762	494	194
С	402	957	647	270
D	153	957	647	270

#### 3.3 Accessories

#### Table 2 Accessories

Centering ring, aluminium, FPM DN 40 ISO-KF	18208
Clamping ring, aluminium DN 40 ISO-KF	18343
Inlet adapter G 11/4"	111005A21
Inlet adapter DN40 ISO-KF	111005A20
Inlet adapter DN63 ISO-K	111005A24
Exhaust adapter DN40 ISO-KF	111005A30
Replacement timing belt 50 Hz versions	E6525604
Replacement timing belt 60 Hz versions	E6525605
Belt replacement tool kit	EK6530942
Pump flushing kit	
Inlet non return valve (for operation > 10 mbar)	111005A15
Inlet adapter NPT 1¼ - 11.5	111005A22
Inlet adapter NPT 2 - 11.5	111005A23
Exhaust adapter NPT 11/2 - 11.5	111005A31
Blow off valve replacement kit	EK6525317

## Description

Caster kit	111005A50
Fail safe gear replacement kit	EK6528264
Inlet non return valve repair kit	EK1637009390

## **Transport and Storage**

#### 4 Transport and Storage

Transport the pump on a pallet or with a crane using both lifting eyes at the top of the pump. Never try to lift the pump on just one lifting eye. Figure: Transportation of the pump on page 12.

#### Storage

Until the pump is put into operation, store the pump in a dry place, preferably at room temperature, sealed with the supplied end caps.



Figure 2. Transportation of the pump

#### **5** Installation



Figure 3. Connections and controls

- 1. Cooling air out
- 3. Cooling air out
- 5. Purge gas port (optional)
- 7. Lifting eye

5.1 Placement

- 2. Inlet flange
- 4. Exhaust flange
- 6. Electrical feedthroughs
- 8. Cooling air in

The cooling air intake and outlets must not have a blockage to prevent insufficient cooling of the pump. Figure: Connections and controls on page 13.

#### 5.2 Conforming Use

The VARODRY range is designed for use in light and medium industrial applications. The pumps are capable to handle small amounts of dust and liquids however the use of inlet filters or liquid traps is recommended in such cases. They are not hermetically sealed and will release small amounts of pumped gases to ambient even if the exhaust port is connected to an exhaust pipework. They are suitable for pumping water steam or other vapors within the limits of the vapor tolerance. The pump can be used both continuously at a suction pressure range of 0.01 mbar to 1050 mbar as well as for cyclic pump operations within this pressure range.

#### 5.2.1 Non-conforming Use

The VARODRY is not suited for pumping of:

- Radioactive substances
- Explosive substances
- Ignitable gas mixtures
- Pyrophoric gases
- Liquids
- Media in significant amounts condensing in the pump (Except from water)
- Solids
- Corrosive gases
- Oxidative substances with the exception of £ 21% oxygen in the air
- Toxic gases

#### 5.3 Connect the Pump

- Remove the caps. We recommend that you retain the caps for decommissioning of the pump.
- During installation work on the intake and discharge lines do not subject flanges to any excessive stresses.

#### Intake side

- At the intake side, connect the pipework to the vacuum chamber.
- The intake line must be clean. Deposits in the intake line can degas and impair the vacuum. The connecting flanges must be clean and undamaged.

#### Note:

Do not allow the ingestion of any objects (screws, welding beads, nuts, washers, pieces of wire, etc.) through the intake port of the pump.

#### **Exhaust line**

- Connect the exhaust line with a hose/pipework to the pump, or when operating the pump without a connected exhaust line, operate the pump only in a well ventilated room.
- The cross-section of the exhaust line must at least match the inside diameter of the connections.
- When pumping vapors, we recommend connecting a condensate separator at the exhaust. The exhaust lines should be laid so that they drop down and away, thereby preventing condensate from flowing back into the pump.



#### DANGER:

The operator must check, whether the pumped gases will lead to safety risks on the environment if the pump is operated without an exhaust line (i.e. risk of suffocation, risk of slipping due to condensing vapors, etc.).

#### CAUTION:



Smaller cross sections may cause an undesirable overpressure within the system. Do not start the pump with a constricted or blocked exhaust. Ensure that any valves or blocking devices in the exhaust line are open. Clogged exhaust lines will reduce the available pumping speed, increase temperature and cause overloading of the pump motor or a dangerous overpressure within the system. There is the risk of bursting. The pump can generate pressures up to 1.5 bar (g) at the exhaust, when the discharge line is shut.

#### 5.4 Removal of Pump Cover

In order to access the electrical terminals, the purge gas or gas ballast connections the pump cover has to be removed. To do the pump maintenance, remove only the front cover of the pump.

To remove the pump cover, do the following steps:

- 1. Allow the pump to cool down in order to avoid receiving burns from hot surfaces underneath the cover.
- 2. Disconnect the inlet flange from the vacuum system.
- 3. Remove the four side screws of front pump cover. Figure: Remove the cover on page 15.

- 4. Slide the front cover by hand and remove from the pump.
- 5. Remove the four side screws of back pump cover.
- 6. Slide the back cover by hand and remove from the pump.



Figure 4. Remove the cover

1. Front cover

2. Back cover

#### 5.5 Electrical Connection

VARODRY is supplied with three-phase motor but without accessories for electrical connection. They must be connected via the appropriate cable, and a suitable motor protection switch.

The pump cover must be removed to connect the motor cable.

Set the switch in accordance with the rating on the pump nameplate.

Please observe the diagram inside the motor junction box.



Figure 5. Electrical connection

After connecting the motor and after every time you alter the wiring, check the direction of rotation. To do so, briefly switch on the motor and make sure that the pump fan rotates in counter-clockwise direction. If not, interchange two phases of the connection.

An arrow (sticker) indicating the correct direction of rotation is placed on the drive cover. To avoid damage to the pump or the vacuum system make sure that the inlet of the pump is not connected to a closed vacuum system when doing this test. Running the pump at full speed in the wrong direction of rotation will generate pressures up to 4.5 bar (g) at the inlet port, if not vented to atmosphere.



Figure 6. Arrow - direction of rotation

#### 5.6 Optional VFD Use

If desired the VARODRY pumps can be operated via an external variable frequency drive (VFD). However it is not allowed to run the VARODRY with more than the nominal speed. A range of suitable VFDs is available as accessories. Please consult Leybold if other types of VFDs shall be used. The permissible motor speed defined in the technical data must be obeyed.

Please note that the pump performance and power consumption is not a linear function of motor speed.

#### 5.7 Purge Gas/Gas Ballast Connection (optional)

The VARODRY has a gas ballast system and an optional seal-purge system. It consists of three components.

1. Gas ballast

The VARODRY is equipped with a gas ballast which feeds ambient air into the pump to dilute condensable vapors and keep the partial pressure below the condensation level. The VARODRY offers two levels of water vapor tolerance, 20 mbar and 60 mbar. The tolerance level can be selected depending on the application requirements. A high vapor tolerance will reduce the vacuum performance of the pump. If the presence of condensable vapors in the pumped gases can be ruled out the gas ballast can be closed. Using the gas ballast will improve the vapor handling but reduce the vacuum performance of the pump.

2. Seal purge exhaust side (optional)

The VARODRY range has no hermetically sealed shaft feedthroughs at the exhaust side. Therefore small amounts of gases inside the pump will escape into the ambient air if no seal purge is used. In order to avoid this the shaft seals at the exhaust side can be loaded with purge gas. The purge gas will create a gas barrier that will prevent gas from inside the pump to escape. Note that a fraction of the purge gas will also escape to the ambient. Make sure that the pump is operated in a room with good ventilation if other gases than air are used as purge gas.

3. Seal purge inlet side

Inlet seal purge can be used if there is a risk that harmful amounts of dust or condensable vapors are present at the inlet of the pump. Such substances could migrate to the inlet side bearings of the pump and reduce the service interval significantly. The inlet side purge is typically only used whenever the inlet pressure increases and is active until a pressure equalization is reached.

Based on the pump type, the VARODRY has either a manual gas ballast or 3 solenoid valves for inlet & outlet seal purge and gas ballast mounted underneath the pump enclosure.

#### 5.8 Manual Gas Ballast Configuration

The VARODRY with manual gas ballast (standard version) is delivered with components that can be mounted to the pump body in order to achieve different water vapor tolerances. The following pictures show the possible setups.

When changing the setup, make sure that the gaskets are in good condition and that the parts are tightened properly.



Figure 7. Manual gas ballast configuration

A. Nozzle 60 mbar water vapor tolerance

Silencer/Filter

C.

- B. Nozzle 20 mbar water vapor tolerance
- D. Plug (no gas ballast)

#### 5.9 Connecting solenoid gas ballast/purge valves

The VARODRY with solenoid valves (optional) has three separate valves as shown in Figure: Connecting solenoid gas ballast/purge valves on page 18.

Connect 24 V DC (!) supply voltage to the solenoid valves that will be used in the application. The valves can be activated independently depending on the application requirements.



Figure 8. Connecting solenoid gas ballast/purge valves

A. Nozzle 60 mbar water vapor tolerance + B. Nozzle 20 mbar water vapor tolerance solenoid valve
 C. Silencer/Filter

## Operation

#### 6 Operation

Start the VARODRY by applying the supply voltage.



#### WARNING:

Connect the pump to an exhaust gas pipework if other gases than clean air are pumped. The exhaust of the pump must not be blocked or constricted. Never operate the pump with the seal-off stoppers in place blanking off the exhaust port.

The VARODRY can be started up to 20 times per hour.

#### 6.1 Switching Off

Switch off the pump by disconnecting from the mains voltage.

If condensable vapors have been conveyed, operate the pump for 30 minutes with closed process valve and open gas-ballast before switching off in order to evaporate the residual condensate.

The pump will run down for several seconds. Due to the design, the vacuum system is then vented through the pump, if no valve is closed between the pump and the vacuum system. In this case, the pump runs backwards until the pressure is equalized. In case of vacuum chambers exceeding a defined volume a valve must be closed before switching off the pump to avoid over-speeding of the pump and contamination of the vacuum system with dust streaming back from the exhaust pipework.

The maximum chamber sizes to be vented through the pump are:

VARODRY VD 65: 500 I

VARODRY VD 100: 800 I

VARODRY VD 160-200: 1000 |

The ventilation process may take several minutes, depending on the size of the container. Wait for the pressure equalization before opening the vacuum system or disconnecting the pump from the vacuum system.

In order to avoid back-venting of the vacuum chamber close the inlet of the pump with a valve before switching off. A suitable inlet non return valve is available as optional accessory.

#### 6.2 Leybold Service

Whenever you send us equipment, indicate whether the equipment is contaminated or is free of substances which could pose a health hazard. If it is contaminated, specify exactly which substances are involved. You must use the form we have prepared for this purpose.

The form Declaration of Contamination for Compressors, Vacuum Pumps and Components is available on www.leybold.com-> Downloads -> Download Documents.

Attach the form to each pump. This statement detailing the type of contamination is required to satisfy legal requirements and for the protection of our employees.

We will return to the sender any equipment which is not accompanied by a contamination statement.

#### 7 Maintenance

#### 7.1 Maintenance Schedule

For the VARODRY products two types of maintenance are required:

- 1. Belt change
- 2. Pump overhaul

The belt change can be done by the user of the pump. (See instructions in Pump Timing Belt Change on page 20).

The pump overhaul requires special equipments and must be done by Leybold Service only.

For determining the operation hours, the VARODRY is equipped with a battery powered hour meter. In order to access the hour meter the pump cover has to be removed. (see picture 3.2)

The lifetime of the battery is limited to 3-5 years. If the battery is empty the hour meter needs to be repaced. Contact Leybold Service for hour meter replacement.

#### Maintenance

#### Interval (operation hours)

	Ambient temperature: 0 °C-30 °C	Ambient temperature: 30 °C-40 °C
Belt change	6000 hours or 25000 start cycles	4,800 hours or 25000 start cycles
Overhaul	24000 hours	19200 hours
Blow off valve inspection (applications which form deposits only)	6000 hours	4200 hours

#### 7.2 Pump Timing Belt Change

The pump timing belt is subjected to wear and must be replaced after a defined operation period (see maintenance schedule). The belt exchange can be either performed by Leybold Service or by the pump user.

#### Accessories required:

- Replacement timing belt (50 Hz Versions: E6525604, 60 Hz Versions: E6525605)
- Belt replacement tool kit (EK6530942)
- Tools for disconnecting the vacuum pipework
- Allen key tool: 5 mm + 8 mm
- Spanners: 19 mm
- Torque wrench: 2.5 Nm 40 Nm
- Soft brush for cleaning

#### 7.3 Replace the Belt

#### CAUTION:



Obey the safety regulations. Make sure that the main power source is disconnected and all parts with electric supply are covered or closed.

Make sure that there is no pressure difference between inlet and outlet of the pump during the belt change as the pressure difference will force the pump to rotate. If this can not be ruled out disconnect the pump from the vacuum system before changing the belt.



#### CAUTION:

Loosening the hexagon nuts of rotors will cause severe bearing damages.

- 1. Disconnect the inlet pipework.
- 2. Remove the 4x bolts (1) with 10 mm socket wrench.
- 3. Lift the pump cover (2) by hand and remove from the pump.



4. Remove the 3x bolts with 5 mm Allen key and remove the drive cover (3).



5. Remove 1 bolt and 1 washer with 8mm Allen key.

6. Remove the cooling fan (4).



- 7. Remove 4x bolts with 5mm Allen key.
- 8. Remove the belt enclosure (5).



- 9. Bring fastening bolts of fail safe gears in vertical position. Place the gear adjustment tool (part of belt replacement tool kit) on gears and fasten. Loosen 4x bolts by rotation with 5 mm Allen key. Remove the gear adjustment tool.
- 10. Remove 4x bolts with 5mm Allen key.
- 11. Remove the fail-safe gears.



- 12. Loosen 4x bolts (6) of motor fixation by 1 rotation with 8 mm Allen key.
- 13. Shift the motor towards the pump body.



14. Remove the timing belt (7).



- 15. Clean pulleys and adjacent parts with a soft brush, if dirty.
- 16. Make sure that the pulleys are dry, free of oil and free of dust.
- 17. Check pulleys for damage or excessive wear.
- 18. Place the new timing belt on the pulleys carefully. Make sure not to twist the timing belt.
- 19. Place the VSM mini tension tester ((8), part of tool kit) in center of the lower free section of the belt.



- 20. Shift motor to adjust belt tension with adjustment tool (part of tool kit) until VSM mini shows 78-88 Hz, when belt is plucked.
- 21. Tighten 4x bolts upto 40 Nm.
- 22. Check belt tension after tightening bolts for motor fixation (78-88 Hz).
- 23. Remove the VSM mini and belt tension adjustment tool.
- 24. Check fail safe gears for damage or wear and replace if necessary (EK6528264). Place both fail-safe gears on the pump shaft.



- 25. Place the bolts for fastening the gears.
- 26. Fasten plastic gears with 2 bolts (10 Nm).
- 27. Do not tighten the steel gear yet.
- 28. Rotate the motor pulley by hand 5-8 revolutions counter-clockwise (do not turn clockwise, until fail-safe gears are fastened).
- 29. When fastening bolts of fail safe gears are in vertical position place gear adjustment tool on gears and fasten it (avoid clockwise rotation of belt).
- 30. Tighten the steel gear with 2 bolts (10 Nm).
- 31. Remove the gear adjustment tool
- 32. Rotate the motor pulley counter clockwise by hand for three revolutions. Make sure that the gears do not touch.
- 33. If gears touch, repeat step 28-32.
- 34. Clean all parts from dust with a soft brush or cloth if necessary.
- 35. Install the below parts in reverse order.
  - Belt enclosure
  - Cooling fan
  - Drive cover
  - Pump enclosure

#### 7.4 Blow Off Valve Cleaning

#### **CAUTION:**



Obey the safety regulations. Make sure that the main power source is disconnected and all parts with electric supply are covered or closed. As there will be exposure to the pumped substances, use appropriate PPE such as rubber gloves depending on the substances that are present in the process.

Accessories required to clean the blow off valve:

- Spanner: 10 mm
- Lint free cloth for cleaning

Water or isopropanol for cleaning

To clean the blow off valve:

- 1. Remove the 4xM6 screws (1) of the blow off cover (2).
- 2. Pull the blow off cover (2) up gently.
- 3. Remove the valve ball (3).
- 4. Check all surfaces for contamination. If required, clean with water or isopropanol.
- 5. Check the valve ball and all O-rings for damage or wear, replace if necessary (EK6525317).
- 6. Reassemble the components (a missing valve ball will destroy the pump).
- 7. Tighten the 4xM10 screws with 8 Nm.
- Note:

VD 160/200 have two ball valves.



Figure 9. Blow off valve cleaning

- 1. Screws
- 3. Ball valve

2. Blow off cover

## Troubleshooting

Malfunction	Possible cause	Corrective Action
Pump does not start up	Wrong or loose connection at motor terminal	Check the connections
	Pump is blocked	Leybold Service
	Belt is broken	Leybold Service
	Motor is defective	Leybold Service
	Wrong supply voltage	Check the mains power or inverter
Motor protective switch	Pump is blocked	Leybold Service
triggers	Motor is defective	Leybold Service
	Wrong setting of protective switch	Set according to value in technical data table
	Wrong direction of rotation	Check and change the direction of rotation if applicable
	Wrong supply voltage	Check the mains power
	Exhaust line is clogged	Clean the exhaust line
Pump does not reach	Inlet filter is clogged	Clean the inlet filter (if in use)
vacuum	Gas leak at the pump inlet	Eliminate the leak
penormance	Wrong rotational speed	Check the mains frequency or inverter
	Wrong setting of gas ballast	Correct if applicable
	Inlet seal purge is defective	Leybold Service
Pump is noisy or has high vibration level	Pump is clogged with process deposition	Follow the cleaning instructions
	Belt is worn/defective	Exchange the belt Leybold Service
	Bearing is defective	Leybold Service

#### 8 Troubleshooting

## Disposal

#### 9 Disposal

#### 9.1 Waste Disposal

DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on waste electrical and electronic equipment (WEEE)

This equipment falls under the provisions of the European Directive 2012/19/EU on waste electrical and electronic appliances (WEEE) and may not be disposed as unsorted waste.

The equipment is labelled in accordance with the European Directive 2012/19/EU 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 check with your local waste authority, customer center or distributor.

The pump may have been contaminated by the process or by environmental influences. In this case the equipment must be decontaminated in accordance with the relevant regulations. We offer this service at fixed prices. Further details are available on request.

#### **WARNING:**



Contaminated parts can be detrimental to health and environment. Before beginning with any work, first find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Separate clean pumps according to their materials, and dispose of these accordingly. We offer this service. Further details are available on request.

When sending us a pump, observe the regulations given in Leybold Service on page 19.



# ormity

## **EU Declaration of Conformity**

(Translation of original Declaration of Conformity)

D-50968 Köln Germany	The manufacturer:	Leybold GmbH Bonner Strasse 498 D-50968 Köln Germany
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herewith declares that the products specified and listed below which we have placed on the market, comply with the applicable EU Directives. This declaration becomes invalid if modifications are made to the product without agreement of Leybold GmbH.

Product designation:	Fore vacuum pump
Type designation:	VARODRY VD 65-200
Part numbers:	111065V, 111100V, 111160V, 111200V

#### The products comply to the following directives:

#### Machinery Directive (2006/42/EC)

The safety objectives of the Low Voltage Directive 2014/35/EU were complied with in accordance with Appendix 1 No. 1.5.1 of Machinery Directive 2006/42/EC.

Electromagnetic Compatibility (2014/30/EU)

Directive RoHS (2011/65/EU) & (2015/863/EU)

#### The following harmonized standards have been applied:

EN 1012-2:1996+A1:2009	Compressors and vacuum pumps - Safety requirements Part 2: Vacuum pumps
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines Part1: General requirements
EN 61000-6-2:2005/AC:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007/A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

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