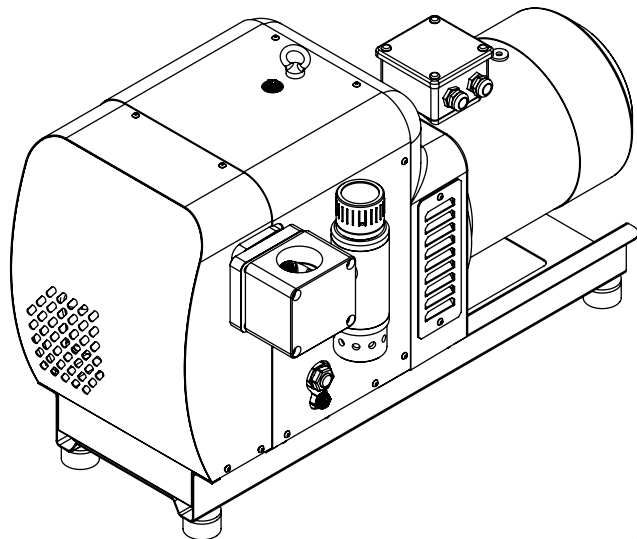


**DRY C 100  
DRY C 250  
DRY C 300**  
*Claw vacuum  
pumps*



***Operating and maintenance  
instructions***

Publication Number:  
**LI 2078.06 March 2022**

# Operating and maintenance instructions

## EN

## Index

<b>1. General information</b> .....	page 3
<b>2. Product specifications</b> .....	page 4
2.1 Pump description .....	page 4
2.2 Expected use .....	page 4
2.3 Forbidden use .....	page 4
<b>3. Safety rules</b> .....	page 5
<b>4. Transport/handling</b> .....	page 6
4.1 Lifting .....	page 6
4.2 Unpacking and components control .....	page 6
4.3 Storage .....	page 6
<b>5. Commissioning and operation</b> .....	page 7
5.1 Location .....	page 7
5.2 Electric connection .....	page 7
5.3 Connection to the machine .....	page 8
5.4 Discharge air pipe line installation .....	page 8
5.5 Commissioning .....	page 8
5.6 Tips for use .....	page 9
<b>6. Maintenance and spare parts</b> .....	page 9
6.1 Maintenance .....	page 9
6.2 Spare parts .....	page 9
<b>7. Lubricants</b> .....	page 9
<b>8. De-commissioning</b> .....	page 10
<b>9. Return for repair</b> .....	page 10
<b>10. Disposal</b> .....	page 11
<b>11. Troubleshooting</b> .....	page 11

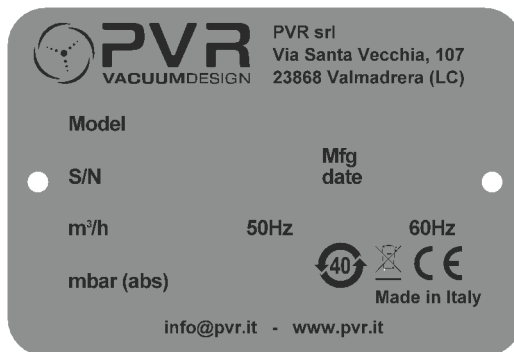
### Attachments

Technical data sheet, exploded view and parts list (RDT)  
EC declaration of conformity (DC)  
Electric motor operating instructions  
Instructions for the accessories

## 1. General information

This manual contains information necessary for the proper operation of the pump in order to prevent unsuitable use and for the safety of the operators. Do not attempt any other type of operation without having first contacted our **Service Department**. The information provided herewith does not intend to replace, integrate or change any rules, regulations, law by decree, directive or law of specific character in force in the Country where the installation takes place.

The suggestions given to the staff engaged in the installation and servicing assumes that the personnel is expert and prepared in facing any problem of servicing, both mechanical and electrical. For any questions or information not included in this manual, please contact our Service Department, always providing: model (Model), serial number (Serial), year of manufacture, stated on the pump name plate.



Symbols used:



**WARNING:**  
Instructions that, if not followed,  
could result in serious  
personal injuries.



**ELECTRIC SAFETY**



**NOTE:**  
Instructions that, if not followed,  
could result in pump damages.



**FIRE HAZARD**

**READ THE OPERATING  
INSTRUCTIONS**



**HOT SURFACES**



**INLET PORT**



**HARMFUL SUBSTANCES  
EMISSIONS**



**EXHAUST PORT**



**DO NOT DISPOSE INTO  
THE ENVIRONMENT**



**DISPOSAL**

## 2. Product specifications

### 2.1 Pump description

The vacuum pumps of the DRY C series have got two rotors having a claw shape, which are rotating syn-chronised by a pair of gears. The pumping chamber is lubricant and seal fluid free. The gears are oil lubri-cated and the same oil is used to lubricate the bearings. The oil tank is separated from the pumping chamber by means of labyrinth seals. Pump cooling is assured with a fan.

The electric motor is flanged and it is connected to the lower shaft by means of a coupling.

### 2.2 Expected use

The pumps of the DRY C series have been designed to handle air and small quantity of water vapour. They are suitable for the evacuation of closed systems or for the operation at a maximum 150 mbar (DRY C 100) and 200 mbar (DRY C 250 / DRY C 300) continuous vacuum. The recommended ambient and suction tempera-ture must be between 5°C and 40°C.

### 2.3 Forbidden use



**ATTENTION:**

**The pump MUST NOT handle:**

- liquids or solid substances;
- dangerous, explosive or aggressive gases and vapours;
- pure oxygen or air mixtures enriched with oxygen;

**It is forbidden to use the discharge of the pump to create even limited pressures.**



**ATTENTION:**

**It is forbidden to install the pump in a potentially explosive environment.**

## 3. Safety rules



### **WARNING:**

**Despite of all the precautions adopted when designing the equipment, there are some risk elements that arise during operation and servicing.**



### **HOT SURFACES**

The temperature of the pump surfaces may exceed 80°C. Install the pump in a protected area accessible only by authorized personnel, to prevent possible personal injuries due to contact with hot surfaces. The pump can be placed inside other machines by adopting the necessary safeguards. Before carrying out any maintenance on the pump, be sure the pump is cold.

### **HAZARD CAUSED BY VACUUM**

Any contact with parts under vacuum can cause injuries. Avoid any contact with the pump inlet port during the pump operation. Introduce air in the inlet circuit before every operation cycle.

### **FOR A SAFE MAINTENANCE**

All maintenance operations must be carried out with the pump idle, disconnected from the electrical supply, with the pump cold, vented to atmospheric pressure. Prevent unexpected start-up (e.g. block the power switch with a personal lock).



### **ELECTRIC SAFETY**

Some components of the electric equipment are electrically charged during operation. Any contact may cause serious injuries to persons or objects. Connection and control of the electric system must be carried out by skilled personnel only. The electrical equipment must comply with the EN 60204-1 standard and with any other law in force in the Country of use. Besides, electrical equipment must comply with EN 61000-6-4 and EN 61000-6-2 standards concerning electromagnetic compatibility and electromagnetic immunity for industrial environment.



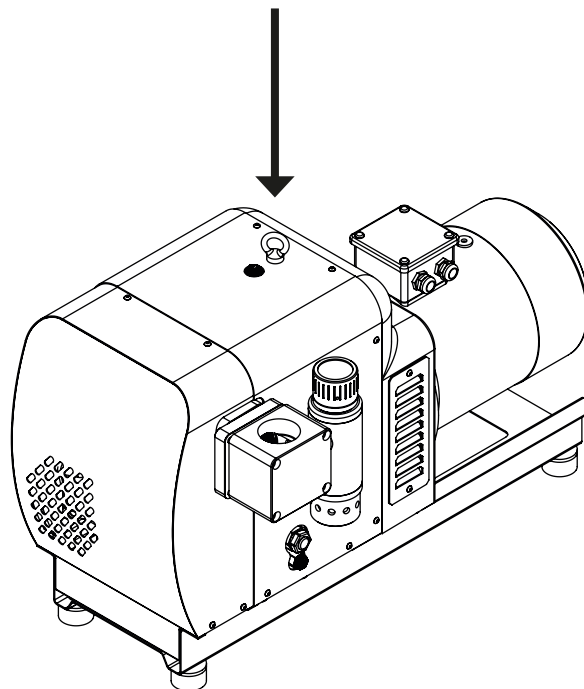
### **FIRE HAZARD**

**WARNING!** The use of the pump in situations unforeseen or not recommended by this manual, as well as lack of correct maintenance, may create high risks for overheating or fire. In case of a fire do not use water to extinguish but use a powder CO<sub>2</sub> extinguisher or other means compatible with the electrical equipment and lubricating oil.

## 4. Transport/handling

### 4.1 Lifting

Use the suitable lifting eyebolt located on the equipment.



### 4.2 Unpacking and components control

When receiving the machine, check that the packing is intact or if it shows signs of damages occurred during transportation.  
If there is no damage, proceed to the unpacking and check further the machine.  
In case damages are found, inform immediately P.V.R. and the carrier.

### 4.3 Storage

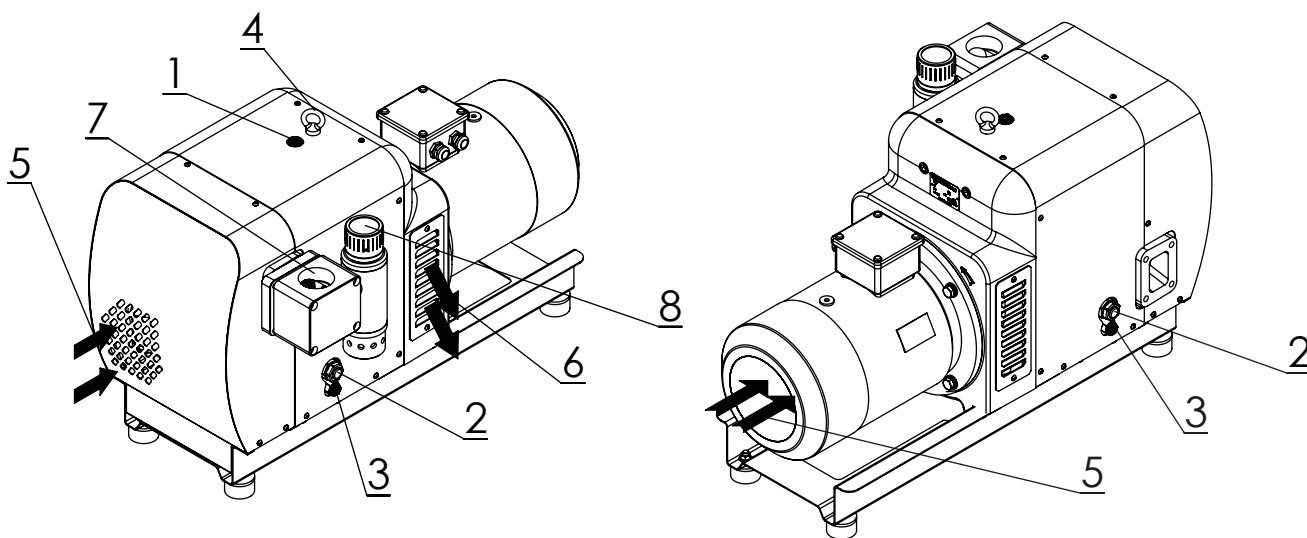
The pumps must be stored or transported without oil and protected from the atmospheric agents at a temperature between  $-15^{\circ}\text{C}$  and  $70^{\circ}\text{C}$  (normal humidity rate max. 95% non condensing).

## 5. Commissioning and operation

### 5.1 Location

Install the pump so that the inlet (5) and the outlet (6) are at least 20 cm away from the closest walls.

Oil filling port (1), oil sight glasses (2) and oil drainage ports (3) must be easily accessible.



### 5.2 Electric connection

The control panel and electric connections must be carried out by skilled personnel and conform to the EN 60204-1 rules or to other local regulations in the Country of use.

The electric equipment must comply with EN 61000-6-4 and EN 61000-6-2 standard concerning electromagnetic compatibility, emission standard and immunity for industrial environments.

Check the main voltage and frequency in use to correspond to the data stamped on the motor name plate.

The electric motor must be protected against overload. The full load amperage value on the motor name plate must be considered when sizing the electrical components and motor protection against overloading.

Make sure the grounding is correctly done.

Carry out the electric connection following the diagram shown on the motor terminal box.

Check direction of rotation by starting the pump for a short time (2-3 seconds). The correct direction is shown by the arrow on the pump. In case of wrong rotation, it is necessary to change the motor rotation by exchanging position of two of the three connections in the motor terminal box.

# Operating and maintenance instructions

## EN

### 5.3 Connection to the machine

The connection to the chamber to be pumped down must be carried out by means of pipes of the same diameter as the inlet port.  
Pipe weights and expansions, if any, must not rest on the pump.  
It is advisable to make the final connection to the pump inlet port with flexible pipes or fittings.  
It is important that all the pipes and the different fittings are tight.  
Very long or small diameter pipes decrease the pump performances.



This symbol identifies the inlet port.

For further information, please refer to the RDT attached herewith.

### 5.4 Discharge air pipe line installation

If the pump has been installed in a room with poor air exchange, it is possible to pipe the pump discharge air to other rooms or outside.

Use pipes with the same diameter as the tank discharge port with a maximum length of 15 m.  
For longer pipes increase pipe diameter. Pipe weights must not rest on the pump.  
In the final length use flexible pipes or pipe fittings.



**NOTE:**

**this pipe must be descending, to avoid the condensate going back to the tank.**



**WARNING:**

**do not connect ball valves to this pipeline.**



This symbol identifies the exhaust port.

For further information, please refer to the RDT attached herewith.

### 5.5 Commissioning

- Fill oil through the oil filler port (1) until the middle level of the oil sight glass (2).
  - Switch the motor on for a few seconds so that to check the direction of rotation.
  - Connect the intake piping to the fitting (7).
- The vacuum relief valve (8) allows to manually regulating the vacuum.



**ATTENTION:**

**Do not remove the vacuum relief valve; Do not operate the pump continuously below 150 mbar for DRY C 100 pump and below 200 mbar for DRY C 250 / DRY C 300. Continuous operation at lower pressures may result in serious pump damage. The vacuum regulating valve must be kept clean to avoid malfunctions. When used in particularly dusty environments, the valve should be applied with protective filter.**



## 5.6 Tips for using

Do not exceed 10 starting/hour. For more frequent starting, install a soft-start device.

Air can be discharged to the atmosphere through a discharge silencer or it can be piped else-where. Pump performance decreases if the pipelines are too small or too long.

## 6. Maintenance and spare parts

SERVICING FREQUENCY	DESCRIPTION OF THE OPERATION	AUTHORIZED PERSONNEL
Monthly	Check the intake air filter cartridge, replace it if necessary.	Operator
	Check the condition of the vacuum regulating valve or safety valve and replace the filter element if necessary.	Operator
Every 3 months	Check oil level.	Operator
	Clean the pump from dust and dirt.	Operator
2000 Hours/every year	Verify and, if necessary, replace the elastic element of the coupling.	Skilled Worker
	Check electrical connections.	Skilled Worker
Every 5000 hours	RVF805 oil replacement	Skilled Worker
Every 10000 hours	RVF315 oil replacement	Skilled Worker
30000 Hours/every 5 years	Pump overhaul	Customer Service

### 6.1 Maintenance

All maintenance operations must be carried out with the pump idle, disconnected from the electrical supply, with the pump cold, vented to atmospheric pressure. Check the oil level through the suitable oil sight glasses (2) periodically. If needed, top it up.

Change the oil every 5000 (Rotant VF805)/10000 (Rotant VF 315) hours of operation, draining the exhausted oil through the discharge ports (3). Use a oil ISO VG 150.

When changing the oil also check the coupling elastic element, replace it if required.



Used oil must be disposed of according to local regulations.

If there is an external inlet filter, keep it cleaned to allow full pump performance.

# Operating and maintenance instructions

## EN

### 6.2 Spare parts

When ordering spare parts, always state the pump model, serial number, year of production, electric motor characteristics (manufacturer's name, model, kW, V, Hz), position reference on the spare parts list, description and quantity needed.

## 7. Lubricants

Synthetic oil recommended for generic use		
Use the synthetic oil for compressors.		
Ambient temperature	Grade	PVR oil
5 - 40°C	ISO 150	Rotant VF 315
5 - 40°C	ISO 150	Rotant VF 805

## 8. De-commissioning

Drain the oil from the pump prior to the removal.

If the oil is polluted, flush the pump with fresh oil (see "oil change").

Drain the oil from the tank, plug the inlet and the discharge ports and store the pump without oil.

In case of pump disposal, separate the pump parts by materials and trash the parts in accordance with the local regulations in the Country of use.

## 9. Return for repair

In case of pump return for repair to P.V.R., provide a list of substances which have come in contact with the pump and advise the risks involved in handling, if any. Drain the lubricant from the pump prior to shipping the pump back.

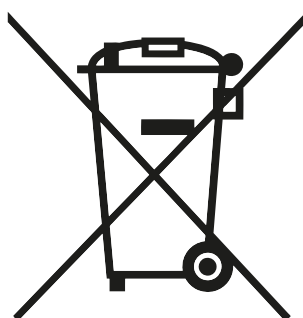
## 10. Disposal

Meaning of the “WEEE” logo found in labels

The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.

This symbol (valid only in countries of the European Community) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system.

The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.



## 11. Troubleshooting

TROUBLE	CAUSE	REMEDY
<b>The pump doesn't work</b>	The motor is not powered by the correct voltage.	Check the electric voltage.
	Motor fault	Replace the motor.
	The coupling is defective.	Replace the coupling.
<b>The pump does not reach the standard pressure in the suction connection.</b>	The suction mesh filter is partially clogged.	Clean the suction mesh filter.
	The suction filter cartridge is partially clogged.	Replace the suction filter cartridge.
<b>The pump is very noisy.</b>	The coupling is worn.	Replace the coupling.
	Oil level too low.	Refill oil.
	Defective bearings.	Repair the pump.
<b>The pump overheats too much.</b>	Insufficient cooling	Remove dust and dirt from the pump.
	Ambient temperature too high.	Respect the permitted ambient temperature.
	Malfunctioning of vacuum regulating valve.	Check valve functionality.
	Inlet process gas temperature inlet too high.	Respect the permitted inlet gas temperature.
	Oil level too low.	Refill the oil.



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