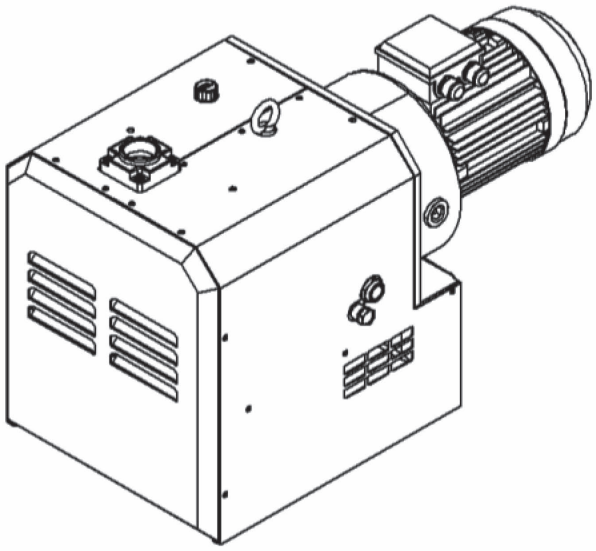
PVR
VACUUMDESIGN

DRY CR 60P
DRY CR 150P
DRY CR 400P
DRY CR 500P
DRY CR 1000P

Claw compressors



Operating and maintenance instructions

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EN
TRANSLATION

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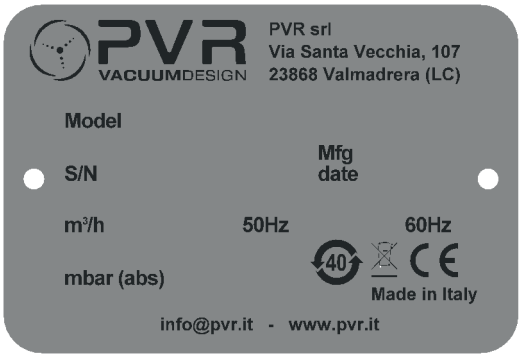
1. General information

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.

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

HOT SURFACES

HARMFUL SUBSTANCES EMISSIONS

DO NOT DISPOSE INTO THE ENVIRONMENT

ELECTRIC SAFETY

FIRE HAZARD

READ THE OPERATING INSTRUCTIONS

DISPOSAL

2. Installation

2.1 Pump description

The DRY CR P compressor is dry and contactless machines, enclosed in acoustic sound shied and designed to have cooling air passed through the sound shied by fan. The warm air is exhausted through the vent. The DRY CR P is constructed in modular construction consisting of two compartments: pumping and gear chambers separated by using labyrinth seals. In the pump chamber, as two rotary claws rotate in opposite direction, the air sucked in, shall be compressed and discharged under pressure. In the gear chamber (box), two gears for synchronizing of claws rotation will be located with oil lubrication. For reduction of the noise, inlet silencer shall be installed in compressor inlet side. For a protection of overload, a pressure safety valve or regulating valve is installed in exhaust. The compressors are directly driven by a flanged motor via a coupling.

2.2 Unpacking

Inspect the box and compressor carefully for any signs of damage incurred in transit. Since all compressors are ordinarily shipped F. O. B. from our factory or regional warehouse, such damage is the normal responsibility of the carrier and should be reported to them.

The compressor is bolted to the skid with studs that are connected through the rubber feet of the pump. Remove the nuts from the underside do the crate and remove the compressor. Unscrew the studs from the rubber feet.

The inlet and exhaust of the compressor are covered with plastic caps to prevent dirt and other foreign substances from entering to it. Leave these caps in place until you are ready to pipe the compressor to your equipment.

2.3 Location

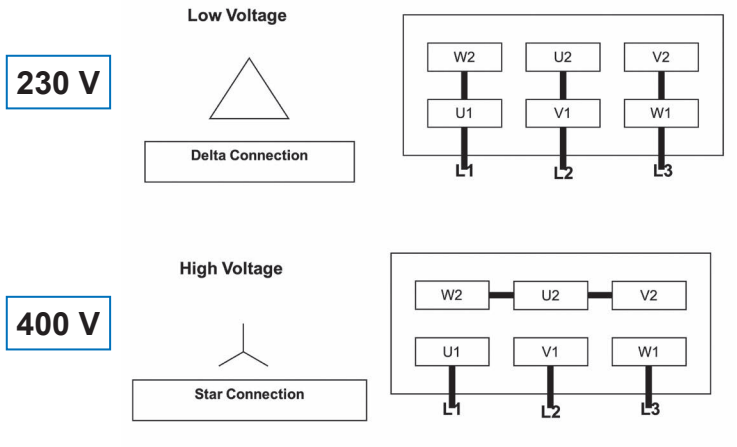
Install the compressor in a horizontal position on a level surface so that it can be evenly supported on its rubber feet. Leave 30 ~ 45 cm of access around the compressor to allow proper cooling. Also, adequate ventilation must be provided for the cooling for the compressor and motor.

Allow access to the oil sight glass in order to inspect the oil level regularly, and the oil fill and oil drain port for easy service.

2.4 Power Requirements

A schematic diagram for the electrical motor terminal connections is located in the junction box of the motor or on the motor nameplate. Typical wirings for Three Phase Motors are as below:

WIRING SCHEME- THREE PHASE MOTOR



The motor must be connected according to the electrical codes through a fused switch in order to protect the motor against electrical or mechanical overload conditions. The overload of the motor starter must be set at a level equal to the full load motor current listed on the motor nameplate.

If the compressor is supplied with a motor starter, it is preset at the factory according to customer specifications.
It is advisable to check that these settings are in line with the voltage at your location. If the voltage is different, please contact PVR for motor and starter information.

Correct direction of rotation is marked by an arrow on the motor fan housing and is counterclockwise when looking at the motor from the motor's fan side.

After electrical connections have been made, the rotation of the motor should be checked. If backward, reverse any two leads of the three at the power connection.

WARNING:
Motors should only be installed by a qualified electrician, who has experience in wiring three-phase motors. Improper electrical installation can cause injury or death.

CAUTION:
DRY CR P compressor must not be allowed to run backwards. The splash lubrication system is not designed for backward operation and this may result in premature failure of the rotary claw machine.

2.5 Pressure Connections

Use a pipe size that is at least the size of the compressor outlet connection. Smaller and long pipe lines result in a reduced compressor capacity.

Compressors operating in parallel on a common main line should have a manual or automatic operated shut-off valve or positive action check valve, installed in the pressure line. Remove the plastic protective cap from the exhaust port prior to connection of compressor to the system.

Should process gas contain dust or other foreign particles, a suitable in line (inlet) filter should be connected to the inlet port. Consult PVR for recommendations.

The following thread sizes are standard on the compressors (NPT thread is available upon request)

Pump Model	Inlet Size	Exhaust Size
DRY CR 60P	G 1"	G 1"
DRY CR 150P	G 1-1/2"	G 1-1/2"
DRY CR 400P	G 3"	G 3"
DRY CR 500P	G 3"	G 3"
DRY CR 1000P	DN 100	DN 100

2.6 Oil Filling on Gear Box

The compressors is shipped without oil in gear box. After level installation and correct rotation has been established, fill the pump with recommended gear oil through the oil fill port. Oil level should be over 3/4 position on the oil sight glass as shown on the label.

Do not add fill oil with compressor running! Do not overfill.

CAUTION:
Running the compressor before adding oil to the gearbox could result in severe damage to the unit. Use of oil that does not meet the recommended specification could result in damage to the unit and void the warranty.

3. Safety

Please read the following safety notices carefully before operating the compressor.

3.1 General Notices

- Understand fully this installation and operating manual before operation.
- The other person except authorized operator should not operate the compressor.
- When the compressor is not properly working, it should be stopped immediately.
- PVR shall have no liability for any accident and failure arising from no compliance with instructions in this manual.

3.2 Warning labels and its explanation

3.2.1 Read and Understand a manual:
Read and understand operator's manual before using this machine.

3.2.2 Burn Hazard:
Hot surface. Do not touch.

3.2.3 Loud noise Hazard
Loud noise hazard. Ear protection must be worn.

3.2.4 Hazardous Voltage:
Disconnect power before opening. Contact causes severe electrical shock

3.3 Warning labels and its explanation

The warning labels shown above should be affixed on the top of the pump's sound shield, except the "Hazardous Voltage" label, which should appear on the cover of motor's terminal box.

4. Operation

4.1 Start-up

Check rotation of the motor as described in paragraph **2.4 Power Requirements**.
Fill the compressor with oil as described in paragraph **2.6 - Oil Filling** Run the compressor for a few minutes and then shut down. Check the oil level again and make sure the oil level is 1/2 position of oil sight glass at stop status.
Add oil though oil fill port on the top, if necessary. Compressor oil should only be added when the compressor is off.

4.2 Stopping the compressor

To stop the compressor, turn off the power.

CAUTION:
Do not use the anti-suck back valveas a check valve. Consult P.V.R. for recommendations regarding check valves and other accessories.

CAUTION:
The maximum number of motor starts per hour should not exceed 10 per hour. Excessive starting of the motor can cause overheating and premature failure of the motor. A minimum run timer should be used with a control panel to regulate starting and stopping of the pump.

CAUTION:
In applications, where the quantity of water vapor is moderate, it is recommended to run the pump for 10 minutes at least with outside air prior to shut down to prevent the vapor from condensing in the pump.

4.3 Operating Conditions

All DRY CR P units are designed for continuous operation as indicated in the **Technical data sheet**. Operating above the maximum pressure can cause serious damage to the machine and the operator.
The safety valve is set to the permitted operating pressure and it opens automatically to relieve any overpressure.

CAUTION: do not operate the compressor without a safety valve.

Standard DRY CR P units are intended to compress dry air only and they must not be used in hazardous environments.
Excessive back pressure on the unit can cause excessive power consumption.
The use of hearing protectors is recommended; external sound insulation can be added to the system if adequate ventilation is provided.
Please consult P.V.R. for recommendations.

The environment and intake air temperature must be between 41°F (5°C) and 104°F (40°C).

CAUTION: Failure to ensure proper operating conditions may lead to severe injury to persons and damage to the compressor.

CAUTION: Maximum number of motor starts per hour should not exceed 10 per hour. Excessive starting of the motor can cause overheating and premature failure of the motor. A minimum run timer should be used with nay panel that may control the compressor with automatic starts and stops based on system pressures.

CAUTION: any non-compliance can cause serious injury to people and damage to the pump.

CAUTION: Do not run the compressor without regulating valve or safety valve. Do not set the regulating valve or safety valve at over permissible pressure. The compressor may be damaged severely.

5. Maintenance

DRY CR P-Series compressors require very little maintenance. To ensure optimum performance, the following maintenance steps should be followed:

5.1 Gear Box Lube Oil

5.1.1 Gear Oil Level

Check the oil level on monthly basis. Under normal circumstances it should not be necessary to add oil between oil changes. A significant drop in oil level could indicate an oil leak. If the compressor is leaking oil, please check the o-rings, drain plug or oil sight glass.

Check the oil level only when the compressor is shut off. Replenish oil if it drops below bottom position of the oil sight glass.

CAUTION:
Do not add oil while the compressor is running. Hot oil can escape from the oil fill port.

5.1.2 Gear Oil Type and Quantity

Oil level should be at the 3/4 position on the oil sight glass.
The following table gives the approximate quantities of oil required for each model.

Pump Model	Capacity (liter)	Oil Model	Ambient temperature [°C]
DRY CR 60P	0.60	Rotant VF 805	5-30°C
DRY CR 150P	0.40		
DRY CR 400P	1.80		
DRY CR 500P	1.80		
DRY CR 1000P	2.80		

Do not add fill oil with compressor running!
Do not overfill.

5.1.3 Gear Oil Change

Under normal ambient conditions with proper gear oil, oil needs to change the oil every 10,000 operating hours. We recommend performing the first oil change after 500 - 1,000 operating hours.

CAUTION:
If different brand of oil is being filled, the old oil must be drained completely from the gear box.

CAUTION:
The interval of lubrication stated above is based on ambient temperature of 20°C (68°F). At 40°C (104°F) ambient temperature, the interval may be reduced to 2,500 operating hours.

5.2 Inline (Inlet) Filter

Check inline (inlet) filter on a weekly basis. The filter cartridge should be cleaned or replaced if it is dirty. Consult P.V.R. for replacement elements.

CAUTION:
Depending on the mounting position of the filter, be careful not to allow accumulated foreign material to fall in the compressor suction inlet when removing the filter cartridge. Horizontal filter installation is recommended to prevent this.

5.3 Maintenance Chart

Weekly	Check inline inlet filter element/mesh. (this might need to be performed more often if there are high particulates in the inlet stream)
Monthly	Check the oil level and protective mesh.
Semi-Annually	Check fans and coupling. Inspection hole with G1" plug: Check the coupling and its insert, and fan through this hole regularly. (The endoscope (WireCam) can be used with Smart Phone software).
Annually	Check Bearings/ Shaft Seals, (this might need to be performed more often if the unit is operating at ambient temperature that exceeds 20°C (68°F).
Every 1500 operating hours	Check grease conditions and add additional grease if necessary, especially if the unit is being operated at an ambient temperature that exceeds 20°C (68°F).
Every 5000 operating hours	Check the gear oil conditions, and if necessary, change the oils.

6. Troubleshooting

Problem Probable	Cause	Remedy
Motor Starter Trips	Incorrect voltage (lower than required).	Check voltage at the motor and correct any sources of voltage drop in thesystem. Check wiring to ensure it is properly sized according to National Electrical Code requirements.
	Incorrect wiring of the motor.	Ensure the motor is wired according to the instructions contained in the motor junction box. Correct placement of the bridges is necessary to configure your motor for the proper voltage.
	Motor starter is not set correctly or is too small for the application.	Check to ensure the motor starter is set for the full load amps at the operating voltage as indicated on the motor nameplate. Be sure to multiply the full load amperage by any service factor that appears on the motor. If the current required is outside the range of adjustability of the starter, replace the starter with a properly sized starter.
	Motor starter trips too fast.	A motor starter with a high current trip delay should be used to avoid nuisance trips on startup.

Problem Probable	Cause	Remedy
Compressor does not reach capacity	Inlet screen (mesh) of the inlet filter clogged with debris.	check inlet filter element and clean screen (mesh) by compressed air or wash it.
	Pipe work is too long or small.	Use the bigger diameter pipe and shorten the lines length if possible.
Compressor runs over set pressure	Pressure Regulator or Safety Valve set over the set point, or is out of order.	Set the point again or replace it with new one.
Compressor does not reach the set pressure	Leak on the compressor or system.	Check the leak on the compressor or system.
Compressor runs very noisy	Contamination of the claws or chamber.	Clean the pumping chamber and the claws.
	Coupling insert is worn.	replace coupling insert in motor/compressor coupling.
	Bearing noise.	replace bearings or call service agent for service or exchange program.
	Pressure regulator or safety valve noise.	replace Pressure regulator or Safety valve.
Compressor is running too hot abnormally	Not enough air ventilation to compressor.	Make certain a sufficient amount of fresh air is supplied to the compressor.
Compressor will not operate (seized up)	Rotary Claws, Bearings or Gears stuck on.	Call service agent for service or exchange program.

7. De-commissioning

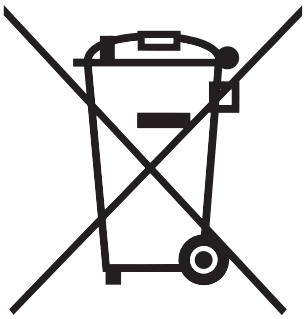
Drain the oil from the compressor prior to the removal.
If the oil is polluted, flush the compressor with fresh oil (see “oil change”).
Drain the oil from the tank, plug the inlet and the discharge ports and store the compressor without oil.
In case of compressor disposal, separate the compressor parts by materials and trash the parts in accordance with the local regulations in the Country of use.

8. Return for repair

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

9. 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.



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