



## **WARNING**

### **Safety precautions**

- a) These pumps are designed for trained personnel only, who must know the refrigeration fundamentals, cooling systems, refrigerants and the possible damage that pressurized equipment may cause.
- b) Carefully read the instructions contained in this manual; strict observance of the procedures described is fundamental for the operator's safety, the perfect state of the pump and constant performances as declared.
- c) Wear suitable protections like safety glasses and gloves; contact with refrigerant may cause blindness and other personal injuries.
- d) Do not operate near open flames and hot surfaces; high temperatures decompose the refrigerant releasing toxic and caustic substances which are hazardous for the operator and the environment.
- e) Avoid skin contact; the low boiling temperature of the refrigerant (about  $-40^{\circ}\text{C}$ ) can cause freezing.
- f) Avoid breathing refrigerant vapors
- g) Always make sure that the pump is connected to a suitably protected mains supply provided with an efficient earth connection
- h) Even if the pump's temperature never reaches high values during evacuation, make sure to place the pump so that it can never cause damages to the operator, such as small burns.
- i) Operate the pump only in locations with suitable ventilation and a high number of air changes.
- j) Before disconnecting the pump, make sure that the cycle has been completed and that all valves are closed in order to avoid release of refrigerant to the atmosphere.
- k) Never fill any tank with liquid refrigerant to more than 75% of its maximum capacity.
- l) When the unit will not be used for a long period of time, disconnect the power supply cord.
- m) During operations avoid release of refrigerant to the environment; this precaution is required by international environmental standards and is essential to avoid difficult leak detection in a refrigerant polluted environment.

# 1. Introduction to WIGAM high vacuum pumps

Wigam high vacuum pumps are rotary vane type and lubricated by oil injection, single and dual stage, complete with gas ballast valve to remove residual condensable gases.

Each stage is equipped with a rotor mounted on a shaft, which is directly connected to the electric motor without joint; in the dual stage pumps, the two rotors are connected to one another in series, in order to reach the best vacuum possible.

## 1.1 General performance and technical data

Pump model		P2S	DIP401	P2D	DIP402	MV6/2	MV12/2	RV25B
Swept volume	l/min	42	80	42	80	150	230	440
Vuoto finale	mbar	$6 \times 10^{-2}$	$6 \times 10^{-2}$	$1 \times 10^{-2}$	$1 \times 10^{-2}$	$1 \times 10^{-2}$	$1 \times 10^{-2}$	$1 \times 10^{-4}$
Nominal power	W	120	180	120	240	300	550	550
Rotation rate	giri/min	2.800	2800	2.800	2800	1.450	1.450	1.450
Oil charge	cc	500	210	400	300	400	700	1.000
Working temperature	°C	0/+40	0/+40	0/+40	0/+40	0/+40	0/+40	0/+40
Storage temperature	°C	-25/+50	-25/+50	-25/+50	-25/+50	-25/+50	-25/+50	-25/+50
Weight	kg	6,5	7,2	6,7	8,2	15,10	18,00	29,50
Supply*		230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	**

\*Other supplied on request

\* Standard supply 230/1/50 or 380/3/50

## 1.2 Gas ballast valve

Wigam vacuum pumps are equipped with a gas ballast valve (\*) (except model P2S), to keep open for about 3 minutes during evacuation; the gas ballast valve allows a good pump starting and prevents polluted vapors from condensing in the lubricant.

# 2. Installation

The pump is supplied without oil charge; before its first use, it is necessary to fill the pump with the correct quantity and type of oil suggested by the manufacturer.

## 2.1 Oil filling

When filling the oil or checking the oil level, the pump must be turned off.

The pump is supplied without oil charge; before its first use, it is necessary to fill the pumps with the correct quantity and type of oil suggested by the manufacturer.

A different lubricant reduces the performances and can irreversibly damage its mechanical parts.

A bottle (two bottles for MV12/2 and RV25B) of 500cc mineral oil is supplied with the pump.

To fill the oil into the pump, proceed as follows:

- unscrew the charging cap (situated on top of the pump)
- slowly fill in the oil up to the middle of the sight glass (situated on the side of the pump)
- screw the charging cap

To avoid excessive filling, we suggest to spill the oil into a graduated bottle first; in this way it is easy to check the correct quantity.

In case of excessive filling, it is necessary to empty the pump and repeat the oil filling procedure.



## WARNING

***Do not pollute environment with the lubricant; it is a special waste and must be disposed of according to the current regulations.***

## 2.2 Suction connection

A shorter and wider hose (as well as a straight "path") reduces time to perform evacuation.

On request, the suction connection can be equipped with a solenoid valve (a solenoid valve is standard equipment on models MV12/2 and RV25B) to prevent the lubricant from flowing back from the pump to the circuit in case of electric power cut.

## 2.3 Vapors discharge

The pump can run without any discharge connection; when large volume circuits must be evacuated or in case the pump is frequently turned on and off, we suggest to replace the standard cap with an oil extracting filter complete with an oil receiver; the oil discharged during functioning is collected by the filter and drops into the oil receiver.



## WARNING

***Always let the pump discharge connection free; its obstruction can cause dangerous overpressures inside the pump's oil sump.***

## 2.4 Electric connection

Check the features of the electric supply: they must comply with those marked on the pump's plate.

With the three-phase pump, make sure that the rotation is clockwise by watching the motor's cooling fan. The motor's electrical winding is equipped with an automatic reset thermal protection that cuts off power supply at +130°C (+266°F).

## 2.5 General precautions

Always make sure that the pump is connected to a suitably protected mains supply provided with an efficient earth connection.

Even if the pump's temperature never reaches high values during evacuation, make sure to place the pump so that it can never cause damages to the operator, such as small burns.

In case the pump is mounted in another equipment, fixing must be such as to be safe for the operator.

The pump's motor is air-cooled with a fan; operate the pump only in locations with suitable ventilation and keep the fan guard at least 4 cm away from walls or obstacles.

## 3. Pump's use

To grant reliability and high quality level, each pump is subjected in factory to a rigorous testing and a suitable preliminary running in.

Constant performances and long operative life are assured by the strict observance of the following procedures.

### 3.1 Pump's starting

Before its first use, it is necessary to:

- fill the pump with oil (see "2.1 Oil filling")
- let the pump run for a few minutes with the suction connection closed.

Check the oil level before the following startings.

In case of malfunctioning, stop the pump and call the technical assistance.

### 3.2 Pump's stop

Make sure to close the suction piping before stopping the pump (only for pumps without solenoid valves). This is to prevent atmospheric air on the discharge connection from pushing the oil into the evacuated circuit when the pump stops.

The mixture of incompatible lubricants (pump's oil and compressor's oil) can cause problems in the good functioning of the compressor.

In case of frequent on-off cycles, do not stop the pump, but close the valve situated at the end of the suction flexible hose, so that you can disconnect it from the evacuated circuit, even if the pump is still running.

Before the pump's stop, let it run for a few minutes with the gas ballast valve open and the suction closed in order to eliminate moisture and residual refrigerant in the pump's oil.

## 4. Routine maintenance

The periodic and correct maintenance of high vacuum pumps allows a long operative life and constant stated performances.

### 4.1 Lubrication

The oil supplied with the pump has been especially manufactured to lubricate high vacuum pumps; minimum viscosity fluctuation in a range of temperature from +10°C up to +100°C (+50°F to +212°F) marks it out.

Its chemical features allow to evacuate cooling circuits operating with CFC or HCFC refrigerants (R12, R22, R502, etc.). We suggest to fill the pump with synthetic oil to evacuate cooling circuits operating with HFC refrigerants (R134a, R404A, etc...); synthetic oil is available on request.

P.S. The pumps equipped with a solenoid valve allow the use of mineral oil with any type of refrigerant.

Oil quantities requested to fill in the pumps are specified in section "1.1 General performances and technical data".

Replace the first oil charge after about 150-200 hours of running; following oil changes must occur every 400-500 hours of running or every 3-4 months.

#### Lubricants – available models for routine maintenance

Mineral oil	Synthetic POE oil
Model: K1 L	Model: SW68
Code: 12002003	Code: 12002004
Viscosity: ISO68	Viscosity: ISO68
Packaging: 1 lt	Packaging: 1 lt

### 4.2 Oil changing

The oil must be changed periodically or when it becomes cloudy because of pollutants. During oil refilling operations, the pump must be turned off.

For oil changing, proceed as follows:

- a) unscrew the oil drain cap situated on the bottom of the pump
- b) let the oil flow completely out
- c) tightly screw on the drain cap again
- d) fill the pump with oil (see section “2.1 Oil filling”)



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## **5. Extraordinary maintenance**

Extraordinary maintenance operations must be effected whenever serious problems occur, such as pumps's overheating, unacceptable vacuum levels, persistent noise, block of the pump and any other irregular functionings.

In such cases, the operator must disassemble the pump, accurately clean its parts and possibly repair or replace the damaged ones.

These operations on the pump must be made by highly skilled personnel, who must strictly observe the above-mentioned procedures and refer to the exploded views enclosed for the identification of the parts. The exploded views are the only way to identify the right part, in order to ask it as replacement and to replace it correctly. For any other information, please contact our technical assistance.

(\*) See exploded view at the end of the manual:

P2D: Ref. 62  
DIP401: Ref. 34  
DIP402: Ref. 34  
MV6/2: Ref. 16  
MV12/2: Ref. 28  
RV25B: Ref. 51

