

RV 360 RV 520



OPERATING AND MAINTENANCE INSTRUCTIONS



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1. INTRODUCTION

This booklet contains the necessary instructions for a correct installation, starting-up, running, and maintenance of the vacuum pump as well as some practical basic rules for a safe operating.

The knowledge of the following contents will grant a long and trouble-free operation of the pump. The observance of these operating and maintaining instructions is absolutely necessary to have the guarantee for defective parts acknowledged.

The manufacturer shall not be deemed responsible for any damages resulting from an improper, incorrect or unreasonable use of the pump.

It is liability of the end user to:

- Comply with the following safety and accidents prevention rules. Use only as explained in the chapter "Normal Use".
- Understand and apply closely the instructions before running the pump.
- Keep the booklet at hand and have it known to all operators.

Pump has to be fitted with its own tag reporting the following data:

Model	Serial number	Year
Max speed	Max pressure	

In these instructions, some graphic symbols are used to draw the attention to some particular operations:



If these safety rules are not respected, operators can be injured and the pump or oilers damaged remarkably.



If these safety rules are not respected, the pump or system can be damaged.



Suggestions for an environment-friendly use of the pump.



Useful information for an easy usage and maintenance of the pump.

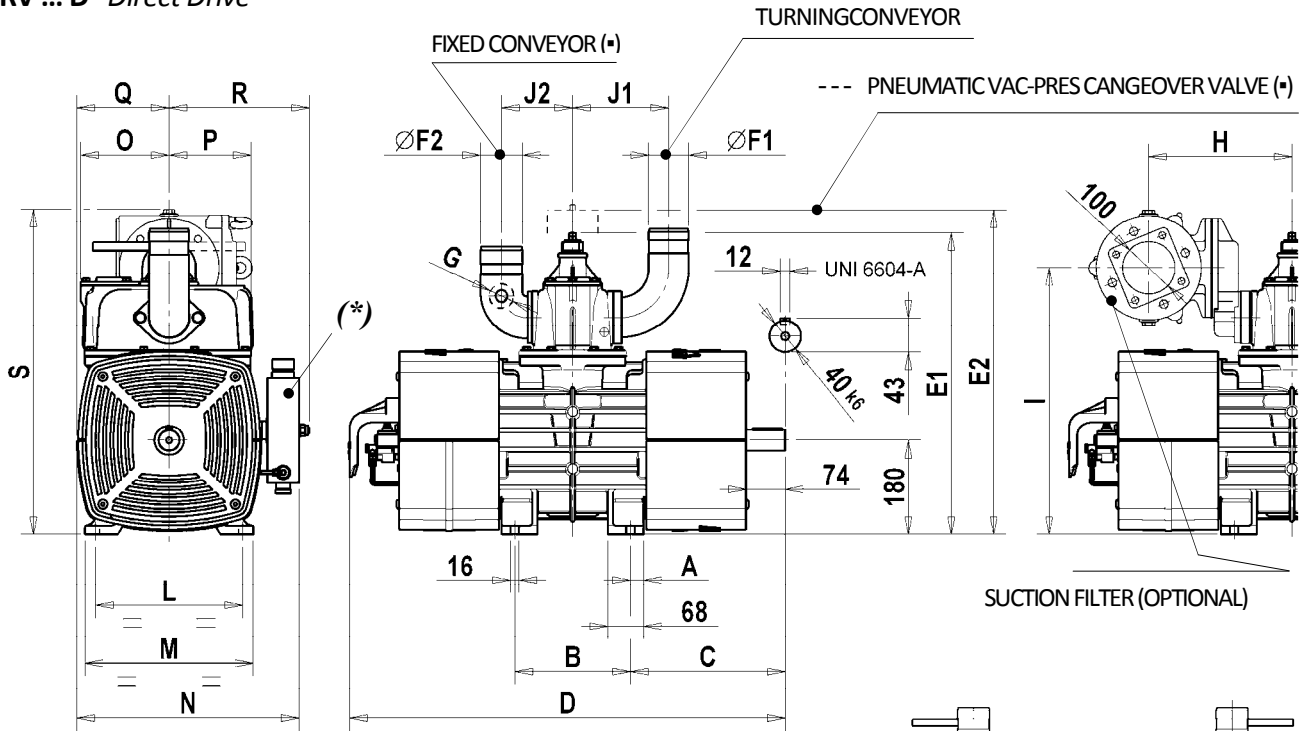
Jurop		
33082 AZZANO DECIMO - PORDENONE - ITALIA		
MOD.		RV360
SERIAL No.		K00001
YEAR		2010
MAX PRESSURE	(bar)	2 ABS
MAX SPEED	(R.P.M.)	1300
MADE IN ITALY		

2. FEATURES RV

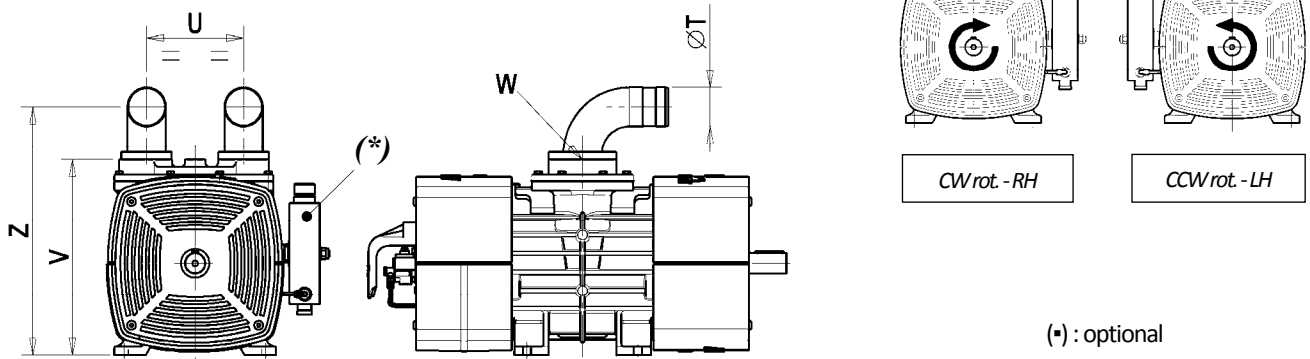
- Rotary vacuum pump cooled by high efficiency contraposed fans.
- The air flow reduces the temperature of the internal parts normally subjected to wear like bearings, vanes and sealings
- Long lasting tangencial vanes
- Bolted axes made in high-tensile steel.
- Automatic lubrication with positive displacement pump.
- N°2 vanes inspection ports.
- Built-in 4-way vacuum/pressure manifold. Pneumatic actuator available.
- Aluminium conveyors.
- Gear mootr hydraulic drive (optional).

2.1 DIMENSIONS RV360 – RV520

RV ... D Direct Drive



RV ... FL Without 4-way manifold



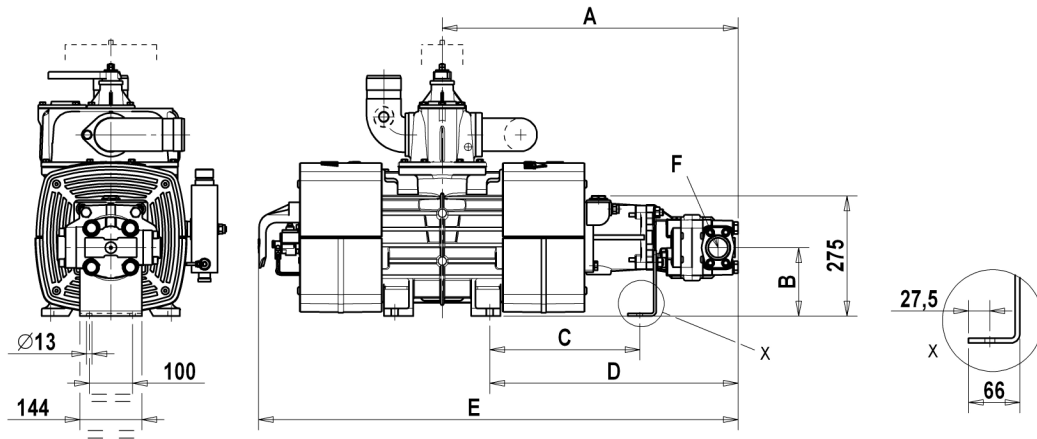
Dimensions [mm]

	A	B	C	D	E1	E2	F1	J1	F2	J2	G	H	I
RV 360	25	220	294	830	577	647	76	182,5	76 80	135,5	G 1 ½	273	510
RV 520	29,5	286	334	975	598	670	80 100	187	80 100	164 167,5	G 2	291	458
	L	M	N	O	P	Q	R	S	T	U	W (**)	V	Z
RV 360	280	320	423	168	160	176	267	620	76	192	G 2 ½	384	488
RV 520	280	320	418	181	174	176	262	566	80 100	210	G 4	392	487

(*) OIL LEVEL INDICATOR AND FILLING PORT OPPOSITE TO SHAFT

(**) FOR THREADED MANIFOLDS ONLY

RV ... HDR With hydraulic motor



	Hydraulic motor characteristics			Dimensions [mm]							Tot. weight	
	Q (cc/rev)	p max (bar)	n max (rpm)	A	B	C	D	E	IN	F OUT	P (kg)	P (lb)
RV 360	61	180	1300	686	156,5	347,5	576	1112	G 1 ¼	G 1 ½	205	452
RV 520	72	250	1300	740	149	387,5	597	1238	G ¾	G 1	250	551

3. NORMAL USE

The vacuum pumps RV360 e RV520 are designed to convey filtered air into systems for the vacuum production or for the suction of powders or liquid wastes. Any other usage shall be considered improper.

Do not sack toxic substances and inflammable or explosives gases, since the internal components of the pump may reach high temperatures.

Liquids or solids infiltrations can seriously damage the pump.

Do not run the pump over its designed operating limits (see "Usage limitations"): it may break and transmission can be damaged.

4. USAGE LIMITATIONS

SPEED (rpm)			P ₂ (bar abs.)	T ₂ (°C)	T ₂ - T ₁ (°C)	Room Temp.
Min	Working	Max	Max	Max	Max	(°C)
800	1100	1300	2	180°C	150	-20 ÷ +40

P₁ : absolute pressure during suction
 P₂ : absolute pressure during delivery

T₁ : temperature during suction
 T₂ : temperature during delivery

5. PERFORMANCES

		RV 360	RV 520
Max Speed	rpm	1300	1300
Free air flow	l/min	10200	14700
	m ³ /h	612	882
Air flow at 60% vacuum	l/min	9400	13200
	m ³ /h	564	792
Max vacuum / Vacuum at continuous duty	%	95 / 80	95 / 80
Power required at: free air / max vacuum rate	kW	14 / 11	19 / 16
Max operating rel. pressure (abs.)	bar	1 (2)	1 (2)
Power required at: 0,5bar rel. / 1bar rel.	kW	18 / 22	24 / 30
Sound pressure level, 60% vacuum at 7m	dB(A)	72	73
Weight	kg	175	220
Oil consumption	g/h	140	160
Oil tank capacity	l	4	4

6. SAFETY AND ACCIDENTS PREVENTION



CAREFULLY OBSERVE THE FOLLOWING RULES

- Installation and maintenance must be operated only by qualified personnel wearing the proper clothes and the necessary tools as well as protection devices.
- Before each maintenance operation:
 - Stop the pump and restore the atmospheric pressure.
 - Disengage the drive system.
 - Only operate after the pump has cooled down.
- When transporting the pump, use proper slinging. Store the pump in stable places.
- Do not start the machine if the protection devices provided for transmissions are removed. Replace damaged parts.
- Do not use the aspirator over its designed limits: the machine may be damaged and the operator may be injured.

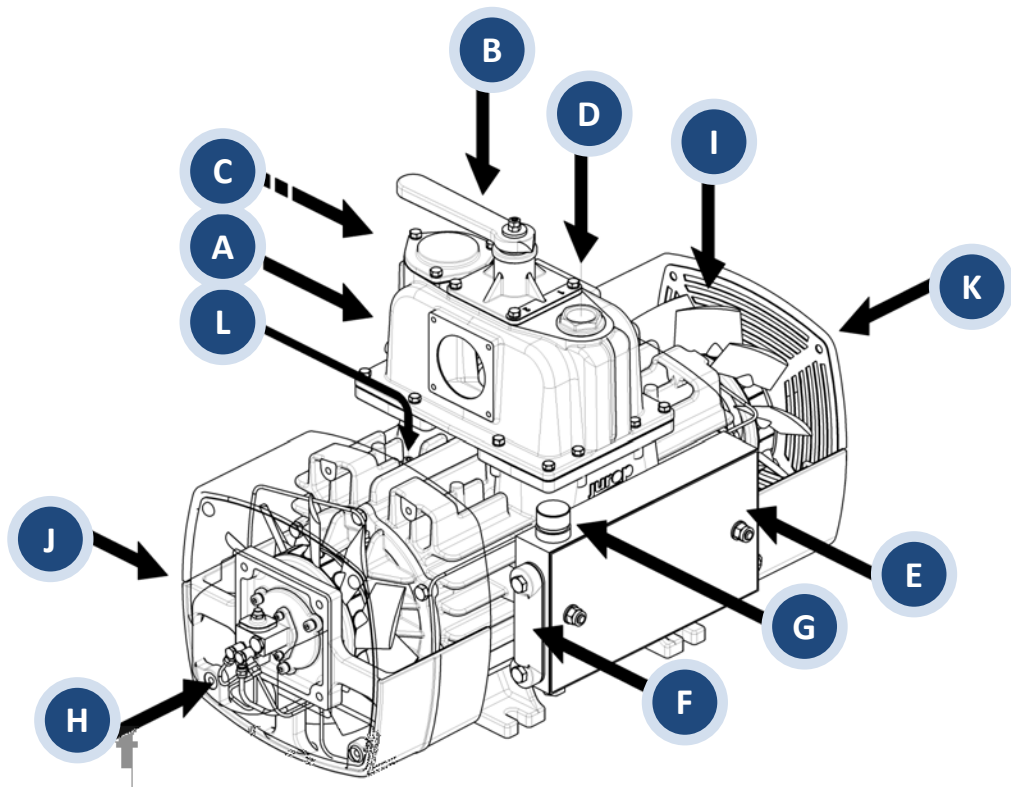
Residual risk

- When the pump is running, some parts may reach very high temperatures (above 100°C). Use all necessary precautions to avoid contact.
- Operators working nearby must avoid prolonged exposure to the noise emitted by the aspirator, if not equipped with the proper ear-protection devices.
- Avoid accidental suction of solids: solids may be projected at high speed through the exhaust manifold and cause injuries.
- Pressure relief valve: point the air flux away from the operators.



Dispose of exhausted oil (accumulated in the silencer's separator at the exhaust) and the oil used in the vacuum pump maintenance (internal wash-up or periodical replacement in the gear box) as provided by current specifications.

7. INSTALLATION



Legend of main components:

- | | |
|--|----------------------------------|
| A. Manifold | G. Oil filler cap |
| B. Vacuum-pressure manifold | H. Lubrication pump |
| C. Non return valve | I. Cooling fan |
| D. Vacuum relief valve connection | J. Air cooling conveyors |
| E. Oil Tank | K. Fan protection |
| F. Tank oil stand | L. Vanes inspection ports |

CHECKING UPON RECEIPT

- When the goods are delivered, make sure that all parts listed on the delivery note are in perfect condition and have suffered no damage during shipping.
- Make sure the vacuum pump has its identification plate affixed on the front cover. Pumps without such identification are to be considered anonymous and potentially dangerous: in such an event, they must not be used, otherwise the manufacturer will be deemed free from any liability whatsoever.

STORAGE

- Pump must be kept in a dry storage area. During storage, inlet and outlet ports must be kept closed.



MOUNTING

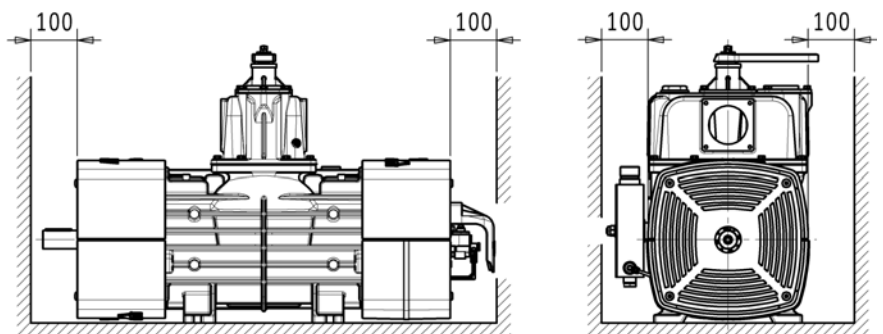
- The pump must be assembled for an easy access for maintenance operations and secured rigidly to a frame or levelled base (max. 5° slant to the horizontal plane). The base must be such as to avoid vibrations, bending or deformation.

Prepare enough room for an easy access to::

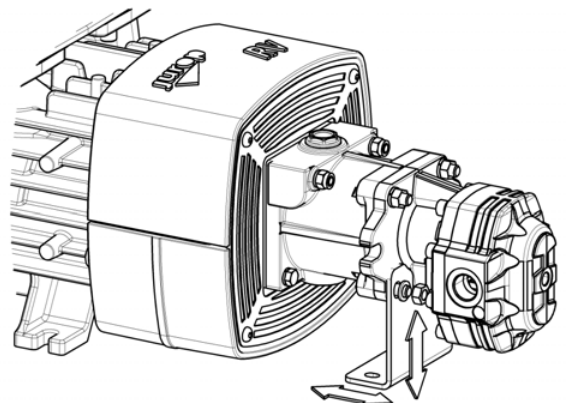
- Vear vanes ports
- Oil level tank
- Oil filler cap
- Lubricating pump (adjusting)
- 4-way valve handle

The oil tank is mounted on the suction side of the housing. Thus, the rotary direction determines the pump overall dimensions. See also paragraph "Dimensions".

- Provide enough space for air ventilation and disposal of heat when pump is running. See also the plan above (dimensions in mm).



- RV ... HDR: securing the drive bracket.
 - Secure the vacuum pump in place by screwing it to the base through its 4 feet.
 - Loosen the nuts on the HDR drive bracket. Adjust the height so that the bracket can bear the drive weight.
 - Fasten the bracket to the base and check that no deformation occurs that may stress the aluminium conveyor.

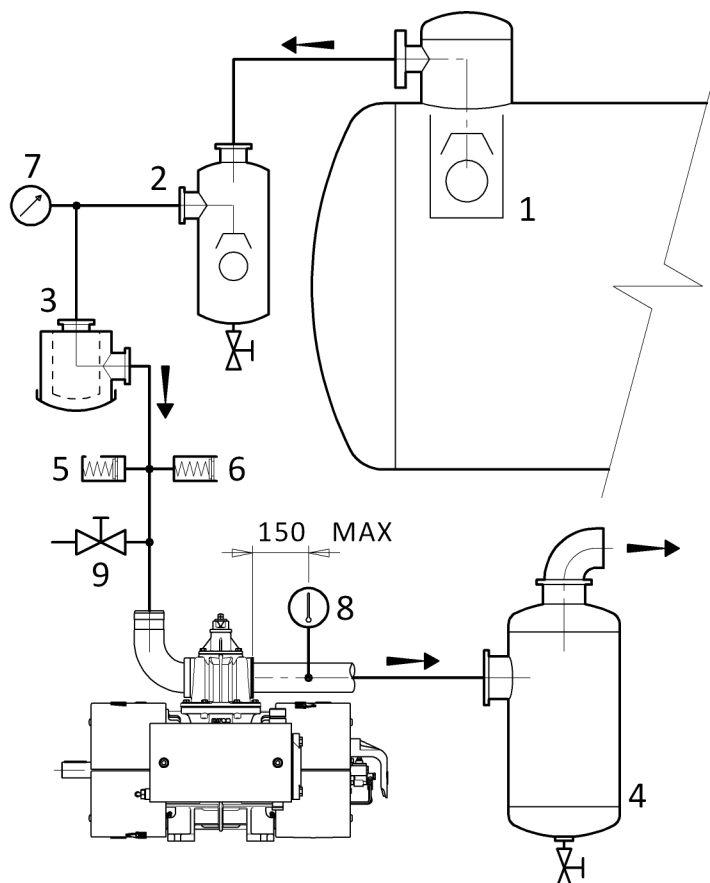




VACUUM – PRESSURE LINE

- In order to avoid the suction of liquids, a primary flow shutoff valve (Pos. 1) and a secondary shutoff (Pos. 2) are to be mounted on the suction line. If necessary, also apply a suction filter (Pos. 3) to prevent solids from entering.
- The silencer (Pos. 4) applied to the pump exhaust - besides reducing the noise level - is designed to separate the oil mist expelled from the pump outlet port. The separator must be easily drained from oil and condensate accumulated at regular intervals.
- The diameter of the vacuum or pressure line pipes must be properly dimensioned to the pump flow and, in any case, it must be larger than the diameter of the ports.
- The pipes weight or their dilatations must not solicit the pump housing. Use high temperature resistant rubber connections.
- Before mounting, remove the port protections. All pipes and line components must be clean.
- Avoid restrictions and tight curves as much as possible, if not strictly necessary.
- Exhaust pipe can reach high temperatures. Hence, they must be properly isolated.
- An over-pressure safety relief valve (Pos. 5) should be mounted in order to prevent the overloading of the vacuum pump (see paragraph “Usage limitations”). Mount the valve near the pump without applying any gate valves on the line.
- A vacuum relief valve (Pos. 6) should be applied to limit the maximum vacuum rate at 80% in order to prevent the pump running at continuous duty from overheating.
- Venting shutter: it is also useful to cool down the overheated pumps as well as for their internal wash-up. Direct the air flow away from the operators.
- Thermometer (Pos. 8): it must be installed at maximum 150 mm from the exhaust port. The sensitive element must reach the pipe centre. Safety thermostat on manifold is supplied on request.

Pos	Description
1	Primary flow shutoff valve
2	Secondary shutoff
3	Net Suction filter
4	Exhaust silencer with oil separator
5	Over-pressure safety relief valve
6	Vacuum relief valve
7	Pressure gauge -1 +3 bar
8	Thermometer 200°C
9	Venting shutter



8. DRIVE

CARDAN SHAFT DRIVE

Use telescopic cardan shafts. In order to achieve a uniform motion of the driven shaft, the following requirements must be met:

- Equal working angle α and α_1 of both couplings.
- The internal fork joints must be coplanar.
- Both driven and driving shafts must be coplanar.

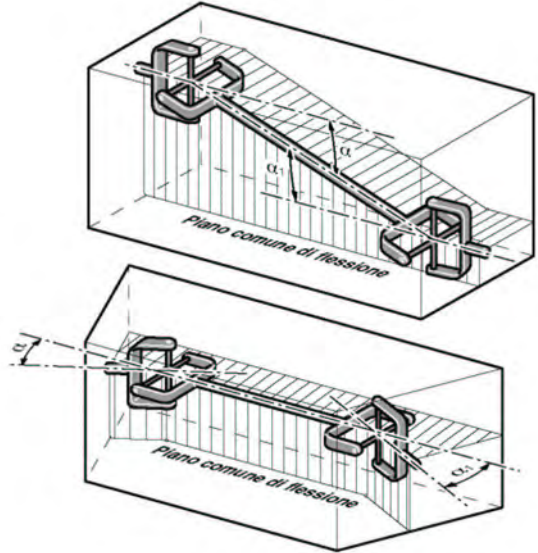
It is also recommended working with limited articulated joint angles (max. 15°).



Follow the rotation direction as indicated on the front flange. Follow the instructions of the cardan shaft's manufacturer.

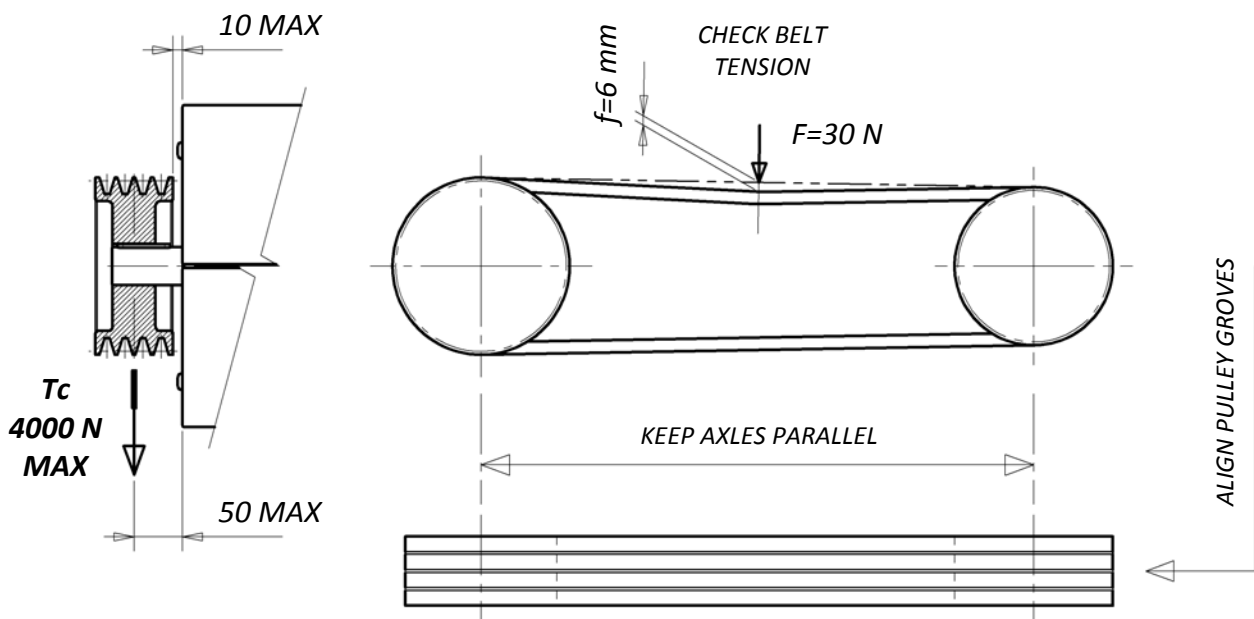


Use the cardan protection supplied with the pump. The pump installation must fulfil the current EC injury prevention specifications.



BELT DRIVE

Model	Belt type	Suggested Driven Pulley Pitch Diam.	Min transmission Pitch Diam.
RV360	XPB x 3	160 – 180 mm	160 mm
RV520	XPB x 4		





- Install a suitable pulley on the smooth shaft as close as possible to the pump: max 50 mm. Taper lock pulley are suggested.
- Belt tension: $T_c = 4000 \text{ N Max.}$
- Do not use driven or driving pulleys with a pitch diameter inferior to 160 mm. Small pulleys require a high belt tension which may cause premature wear to the bearing or transmission damages.
- Let the air circulate freely to cool down the pump.
 - Equip the pump with pulleys with a pitch diam. = MAX 180 mm.
 - Design guards to guarantee a sufficient ventilation in compliance with the EC regulation on injury prevention in force.



HYDRAULIC DRIVE

- **Motor features**

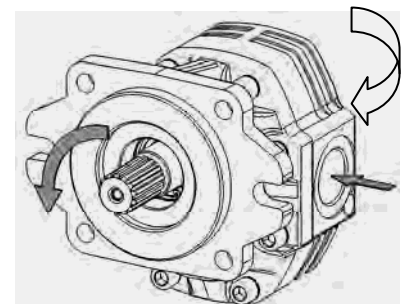
	Displacement <i>cc/rev</i>	Operating <i>bar</i>	Max pressure	
			Draining line <i>bar</i>	Motor exhaust <i>bar</i>
RV360	61	180	5	5
RV520	72	250		

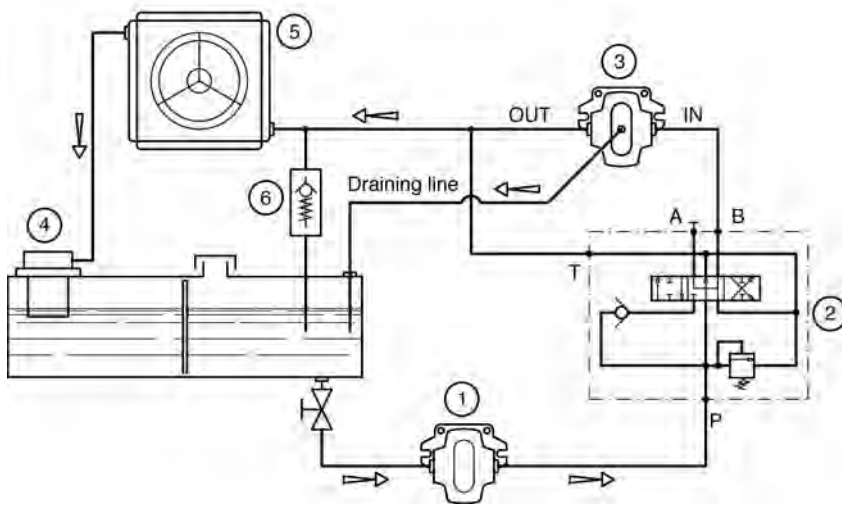
- **Fluid:** mineral oil for hydraulic systems in compliance with ISO/DIN. ISO/DIN.

Temperature $^{\circ}\text{C}$	Optimum viscosity <i>cSt</i>	Max viscosity allowed <i>cSt</i>
-20 / +80	12 - 100	750

- **Filtrazione:** contamination class 19/16 according to ISO 4406 to be obtained with $\beta_x = 75$ filter.
- **Check circuit connections:** they must be applied in the same rotation direction as that indicated by the arrow on the pump front flange.
- **Draining:** connect directly to the tank above the maximum oil level. Operating without draining line may damage the motor.

**DRAINING
PORT**





Pos	Description
1	Hdr pump
2	Distributor
3	Hdr motor
4	Oil filter
5 *	Heat exchanger
6 *	Safety valve

* : optional components

- **Distributor:** open-centre distributor in central idle position (vacuum pump off). It must be equipped with an adjustable overpressure safety valve.
- **Motor pipeline:** outlet pipe must not be of a smaller diameter than that of the inlet port. Inlet pipes always have a diameter smaller than outlet pipes. Choose preferably flexible pipes to avoid vibration transmission.
- **Tank:** with suction pipe and return separated by baffles. If necessary, use a heat exchanger to avoid oil heating above 70-80°C and protect it from extreme pressure with a pressure relief valve. Minimum approximate capacity: as twice as the circulation flow.
- **Starting-up:** be sure that the system is well cleaned and pour oil into the tank and into the motor housing (necessary to lubricate the internal bearings).
 - Vent the circuit and adjust the overpressure safety valve to the lowest possible value.
 - Check the oil tank level.
 - Increase pressure and rotation speed until operating values are reached.

PRECAUTIONS WHEN STARTING THE SYSTEM

Check oil levels in gearbox and side mounted tank.

Check that all protection devices are correctly installed.

Check that there are no obstacles in the vacuum line.

Check rotation direction: open all system valves and start running slowly.



Do not rotate in the wrong direction: this may damage the vacuum pump. Follow the arrow indicated on the front flange.

Check which position of the four-way integrated valve lever allows vacuum or pressure functioning.

Close the valve and increase vacuum rate (or operating pressure).

Check loading and operating speed for vibrations or unusual noises.

WARNING



The RV vacuum pump is designed to work at the maximum speed. When running it under heavy load (high vacuum rate, prolonged running, high room temperature) though, it is recommended:

- to reduce the speed to the working rpm as indicated in paragraph “Usage limitations”;
- to reduce the vacuum rate to MAX 80%.

9. OPERATING PRECAUTIONS



- Run the vacuum pump at a room temperature of -20°C to +40°C.
- Running at continuous duty: MAX 80% vacuum rate, MAX 1 bar pressure. Higher vacuum rate is allowed only at intermittent duty.
- Prevent the pump from overheating. Maximum air temperature at exhaust: 180°C.
- If maximum temperature allowed is reached, in order to prevent damages to the internal parts, it is recommended:
 - to reduce the vacuum rate or the working pressure by opening the venting port;
 - to reduce the pump speed to app. 800 rpm;
 - to start running the pump again only when temperature at exhaust is below acceptable values.
 - Safety thermostat on the manifold is supplied on request.
- Do not run the pump without lubrication: it may cause a quick wear and a possible breakdown of vanes.
- Check rotation speed. The vacuum pump must:
 - never exceed the maximum speed: it may cause overheating;
 - never run below the minimum speed: this may cause an anomalous wear of the housing.
- Do not accidentally operate the pump in the wrong direction: vanes are likely to break.
- Do not start running the pump under load: that causes stress to the drive system.
- Do not convey the safety relief valve outlet towards the suction port, otherwise it will suck warm gas.
- Control the air flow by adjusting the rotation speed: do not use the safety relief valve to discharge the exceeding flow.
- Internal wash-up is necessary after prolonged inactivity, after working in dusty environments or in case of accidental suction of liquids. The following operations must be carried out only when the pump has cooled down:
 - disconnect the exhaust silencer, if possible;
 - start running the pump at low speed (app. 500 rpm) with a low vacuum rate (MAX 20-30%);
 - suck some water (1-2 litres) from the suction port;
 - then, suck some oil (1 litre) to complete the wash-up and to lubricate the internal parts.



In case the exhaust line cannot be disconnected, drain the liquids accumulated in the separator of the exhaust silencer.

WARNING



ROTATION SPEED

Once the required vacuum rate has been reached, we recommend the vacuum pump speed be reduced to its working speed (see paragraph “Usage limitations”): this allows to maintain the achieved vacuum/pressure rate constant. The pump speed can also be reduced to values lower than the working speed when discharging the tank (with the pump in pressure mode) without increasing the draining time. Thus, exhaust temperature is reduced, vane durability is increased and both oil consumption and power absorption are reduced.

10. ORDINARY MAINTENANCE



Before starting any maintenance operation, follow the safety prescriptions as described in paragraph “Safety and accidents prevention”.

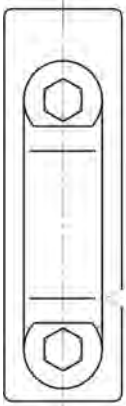
OPERATING	Rotating speed	D
	Working pressure.	D
STANDSTILL	Side mounted tank oil level	D
	Clean filter and vacuum line shutoff. Drain the oil gathered in the exhaust separator.	D
	Clean fan protections.	D
	Clean suction filter	W
	Check vanes wear	M
	Check safety valves	M

Frequency:

D: daily

W: weekly

M: monthly



CHECKING THE SIDE MOUNTED OIL TANK LEVEL

Do not run the pump with oil level under the minimum level: that may lead to dry functioning and cause serious damages.

Tank capacity: 4 litres. Use pure fresh oil.

MIN

Do not re-use the exhausted oil gathered on the bottom of the exhaust silencer

Recommended lubricants.

Room temp.	Viscosity	Type	AGIP	ESSO-MOBIL	SHELL	TOTAL-ELF	BP
Below 10°C	ISO VG 46	Mineral oil	ACER 46	NUTO H 46	MORLINA S1 B 46	CIRKAN C 46	ENERGOL CS 46
Above 10°C	ISO VG 150	Mineral oil	ACER 150	NUTO H 150	MORLINA S1 B 150	CIRKAN C 150	ENERGOL CS 150

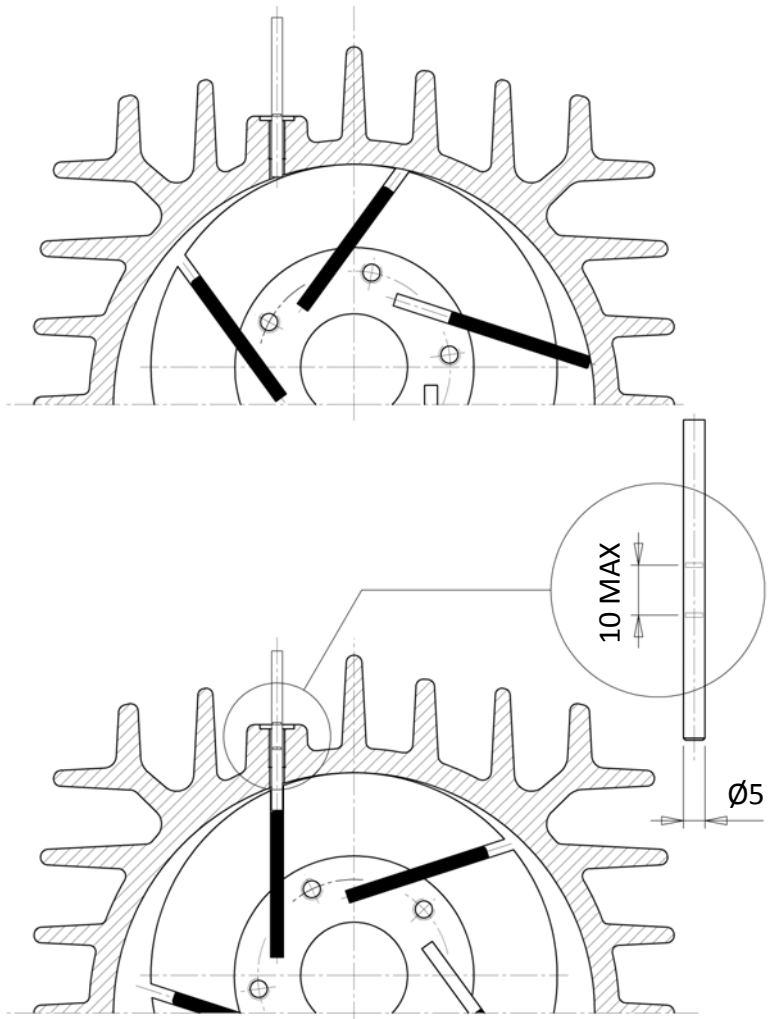
CHECKING THE VANES WEAR

- Unscrew the plug on the vanes inspection port.
- Insert a $\varnothing 5$ stick until it touches the rotor and then mark.
- Turn the rotor slowly until the stick touches the vane in idle position in its seat. The vanes slide to the bottom of the seat due to gravity: check they really do and mark again on the stick.
- Repeat the same procedure for all the vanes.



If wear exceeds 10 mm: replace the vanes as soon as possible.

- Maximum acceptable wear: 12 mm. Immediately replace: vanes are likely to break down.
- Replace all the pump vanes at the same time.

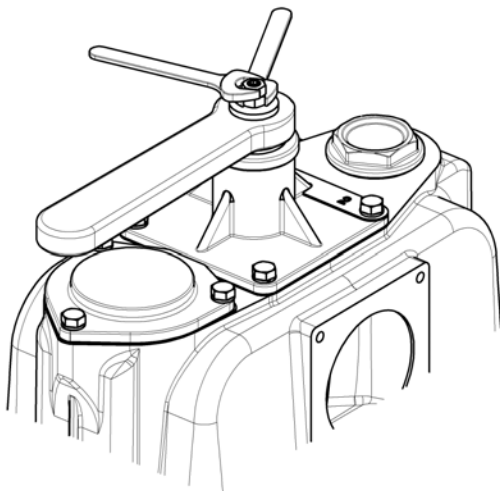


11. EXTRAORDINARY MAINTENANCE



Before starting any extraordinary maintenance operation, make sure the pump stands still. Before starting any maintenance operation, observe the safety prescriptions as described in paragraph "Safety and accidents prevention".

ADJUSTING THE MANUALLY OPERATED 4-WAY VALVE



For pumps equipped with handle for manual operation or with hydraulic actuator.

Adjust the nuts to avoid the valve blocking in its seat.

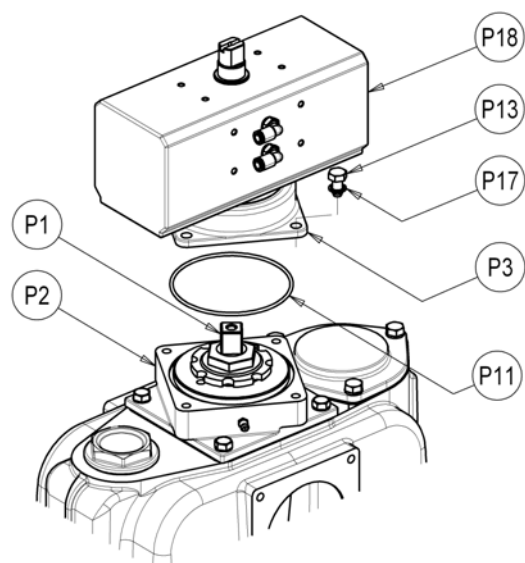
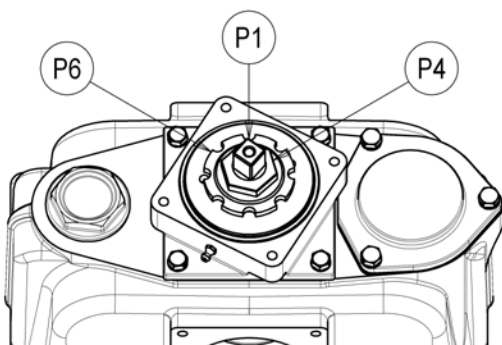


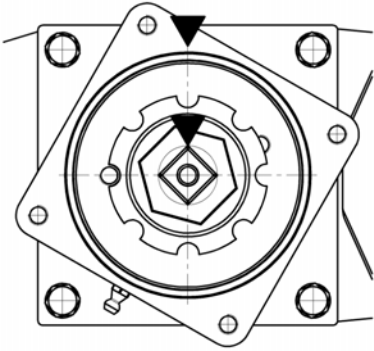
Do not exceed: a vacuum loss is likely to occur.

ADJUSTING THE PNEUMATICALLY OPERATED 4-WAY VALVE

In case of reduced performance or difficult rotation of the valve in its seat, it is necessary to adjust the operating play.

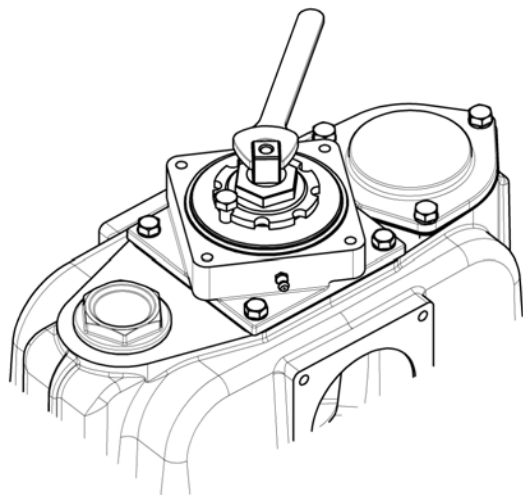
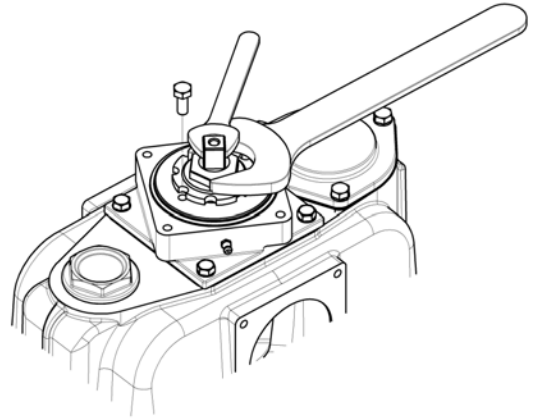
- Unscrew the 4 screws M8x16 which fasten the top cover (P3) to the inferior support (P2).
- Clean the inner part from the lubricant.





- “Mark” the initial position of the cock (P1). When mounting the cock back in place, it must be in the same position.

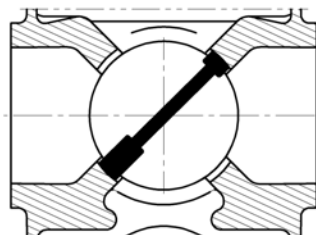
- Turn the valve until one of the cock regulation ferrules (P6) coincides with one of the threaded holes on the inferior flange (P2). Block temporarily the nut ferrule with a screw.
- Hold the valve in place with a 17 mm spanner and loosen the nut (P4) over the ferrule by ½ - ¾ turn with a 36 mm spanner.



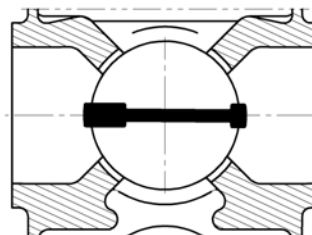
- Valve adjustment: turn the valve clockwise by 1/8 turn (45°) in order to lower it (in case of excessive play between the valve and its seat and of reduced performance) or anticlockwise by 1/8 turn (45°) to raise it (in case of difficult rotation of the valve in its seat).

- Hold the valve in place with the spanner and fasten the nut (P4) above the ferrule.
- Remove the screw which temporarily blocks the ferrule and check for the correct rotation of the valve by adjusting the shaft frame. Repeat the valve adjustment, if necessary.
- Important note: get the valve back into the previously “marked” position. Otherwise, the valve may work improperly.

The valve - in both its end stroke positions - must separate the air flow sucked from the pump outlet air. The pump may be started in order to check for the proper functioning.



OK



NO

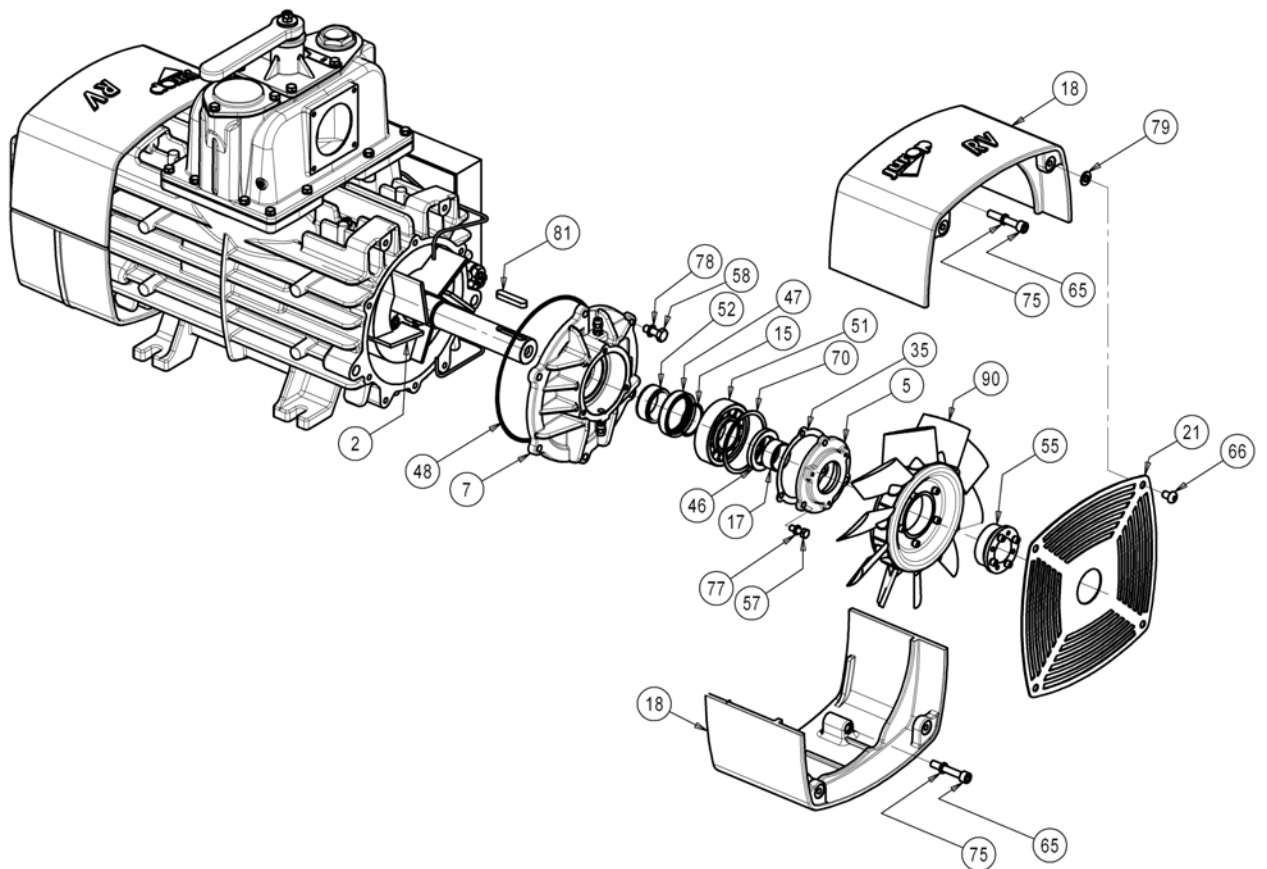
- Lubricate the areas near the ferrule in order to guarantee the lubrication of parts undergoing wear.
- Set the top cover back into place. Do not forget the OR-Ring (P11). Fasten the 4 screws.

REPLACING THE VANES

- Remove the vacuum pump from its base and wash it before disassembling.
- We recommend that you work on the pump front. The following drawings refers to RV520 Model.

Materiale soggetto ad usura da sostituire (se necessario) in questa occasione.

Pos.	Detail	RV360	RV520	Pcs
2	Vane	16016 059 00	16016 069 00	5
17	Front oil seal bushing	16260 011 00		1
35	Seal cap gasket	16807 073 00		1
46	Front oil seal 65x45x8	4022 2000 44		1
47	Rotor seal 70x55x15	4022 2001 15		1
48	OR 4875	4022 2003 09		1
52	Rotor seal bushing	4023 1300 35		1



Disassembling

- Disconnect the drive system, if this is the case, and check conditions.
Hydraulic drive: mark the position of the driven shaft on the pump shaft.
- Remove the conveyor protection (21).
- Remove the aluminium conveyors (18).
- Loosen the 4 screws which blocks the locking set (55) and remove the cooling fan (90) with the hub.
- Remove the seal cap (5). Do not lose compensation ring (70) and seal cap gasket (35).
- Remove the vacuum pump flange (7) by using the threaded holes to extract it. Do not lose OR-Ring (48) and distance ring 0.15 mm (15) (RV520 only).
Hold the shaft before extracting the flange: the rotor weight must not solicit the internal components.
- Extract the worn vanes.
- Complete disassembling:
 - extract bearing (51) and seal (47) from the pump flange (7).
 - extract seal (46) from the seal cap (5).

Checking the wear condition

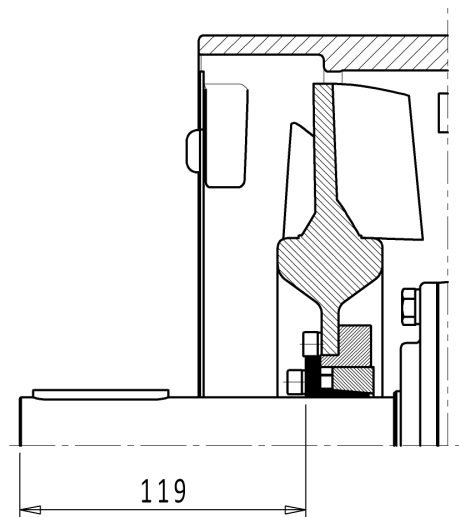
Check the condition of following parts:

- Seals and gaskets: they may be worn or have been damaged during disassembling.
- Bushings: we recommend they be replaced if remarkably scratched.
A grinder may be needed to cut them for removal. Prevent iron filings from entering the pump.

Check whether the seal and the corresponding bushing need to be replaced also on the pump rear according to their general condition.

Reassembly

- Oil and then insert all vanes in their seats.
- Vacuum pump flange (7): insert seal and bearing if they have been previously removed or need to be replaced.
- Seal cap (5): insert the new oil seal if replacement has been needed.
- Bushings on pump axle: new bushings may need to be warmed before reassembly. Align them properly.
- Reassemble the parts in the following sequence:
 - vacuum pump flange: do not damage the seal while inserting it on to the axis.
Correctly centre and fasten the screws. Properly align the bearing into its seat.
 - Front seal cap: do not damage the seal while inserting it on to the axis and fasten the screws.
 - Fan with docking set:
 - respect the correct distance from the axis head;
 - fasten the 4 screws of the docking set with a 10 Nm coupling.
 - Reassembly the conveyors and their protection.

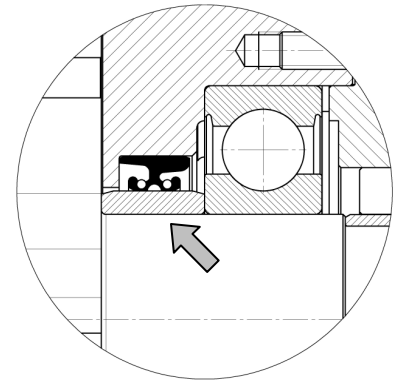


ATTENTION



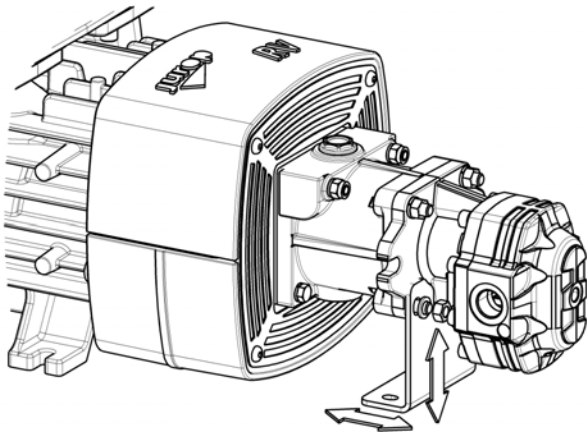
Do not damage the parts during assembly nor force them excessively.

Do not turn the seal rim upside down while inserting onto the shaft. Do not forget foreign bodies inside the pump.



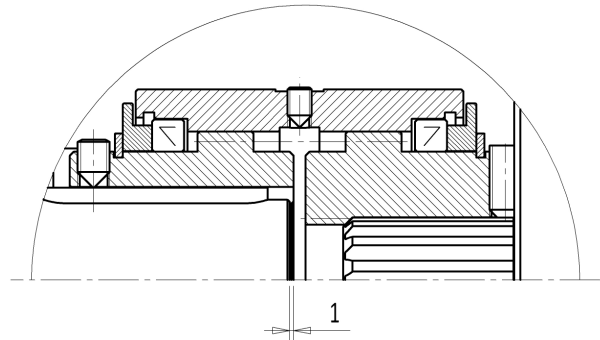
MOUNTING THE HYDRAULIC DRIVE

We recommend the drive coupling be oiled when vanes are being replaced.



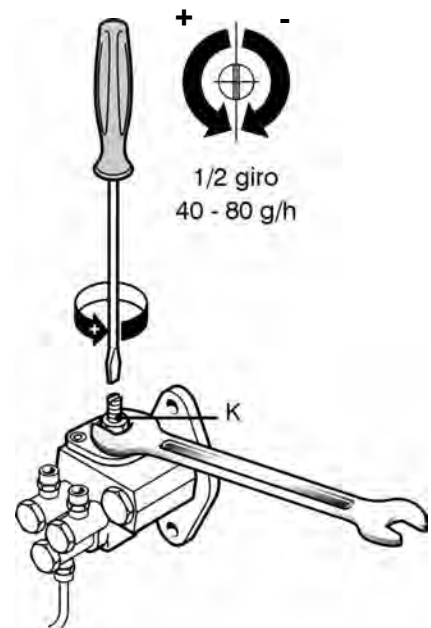
- Apply coupling hub (H1) to vacuum pump axis respecting the position marked during disassembly: the grain must go back into the seat on the rim.

- Mount the coupling (H1) and lubricate internally with grease.
- Reassembly the motor without forcing onto the seals (H9).



ADJUSTING THE LUBRICATING PUMP

- The automatic lubricating pump is adjusted by the manufacturer before shipping. If consumption differs noticeably from the designed value, adjust it as follow:
 - Remove the top protection cover.
 - Use a screwdriver and a 10 mm wrench to adjust the adjusting screw (K). Close the nut and set the top protection cover back into place.
 - We recommend the screw be turned by $\frac{1}{4}$ turn and then the actual consumption of the pump be checked. Clockwise rotation: flow is reduced. Anticlockwise rotation: flow is increased.





Do not reduce oil consumption below the value indicated in par. "Performances" (for functioning at speeds different from the maximum, flow is proportionate to rotating speed).

By ½ turning the adjusting screw, the flow changes by app. 40 - 80 g/h, depending on running conditions.

12. TROUBLESHOOTING

Insufficient or absent lubrication	Verify oil fittings. Check oil pump efficiency
Low tank oil level	Fill tank with oil
Excessive rotation speed	Reduce rpm to the prescribed working speed
Prolonged functioning at max vacuum rate	Reduce vacuum rate
Poor ventilation	Provide enough room all around the pump. Verify fan conditions, clean fan protections
Insufficient diameter of vacuum and/or exhaust line.	Check dimensioning

The vacuum pump does not rotate	
Broken vanes:	Clean inner chambers, replace vanes
- due to infiltrated solids	Check the secondary shutoff and filters of the suction line
- due to insufficient lubrication	Check the oil pump
Power transmission breakdown	Check and replace the damaged parts
Ice inside the pump (during the cold season)	Remove ice and slowly start running it. Avoid suction of water.

Riduced performances	
Four way changeover valve in idle position	Move the lever to vacuum or pressure mode end stroke.
Four way changeover valve not correctly registered	Adjust the functioning play and lubricate
Worn vanes	Replace vanes
The non-return valve leaks	Clean or replace if necessary
Worn seal rings	Replace
Tank gate valves or gaskets leak	Replace damaged or worn parts
Tank connection pipes leak or are obstructed	Replace damaged pipes
Obstructed primary shutoff or suction filter	Remove and clean
Encrusted exhaust port	Remove and clean
Vacuum line components are too small dimensioned	Verify dimensions for pump maximum performances
Obstructed rubber couplings	Replace

Unusual oil consumption	
Insufficient or absent lubrication	Check and adjust the lubricating pump

13. SCRAPPING

Before dismantling, the following components must be properly disassembled and divided:

- Lubricating oil
- Rubber and plastic parts
- Cast iron, steel and aluminium parts



Do not leave in the environment. Do not use dismantled parts as spare parts

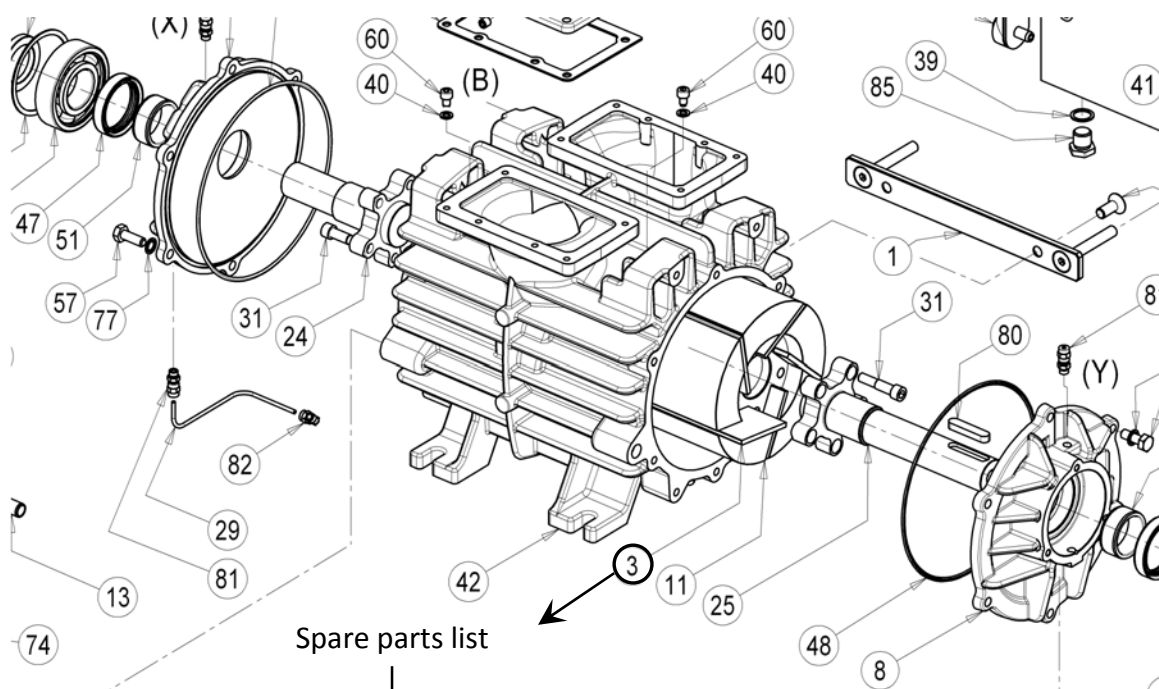
14. SPARE PARTS ORDER

When ordering spare parts please provide the following details:

Identify on the spare parts drawing:

- Code
- Description
- Quantity

(e.i.: 1601605900; RV360 vane; 5pcs)



Pos.	Code	Description	Pcs
1	1513053300	RV360 side mounted oil tank support	1
2	1587009400	Oil tank	1
3	1601605900	RV360 vane	5
4	1605500000	Cock handle	1
5	1608501700	Cock	1
6	1610508200	Seal ring cap	2
7	1610510800	4-way manifold cap	1

Identify on the pump plate:

- Model
- Serial No°

(e.i.: RV360; K00001)

Juop	
33082 AZZANO DECIMO - PORDENONE - ITALIA	
MOD.	RV360
SERIAL No.	K00001
YEAR	2010
MAX PRESSURE (bar)	2 ABS
MAX SPEED (R.P.M.)	1300
MADE IN ITALY	