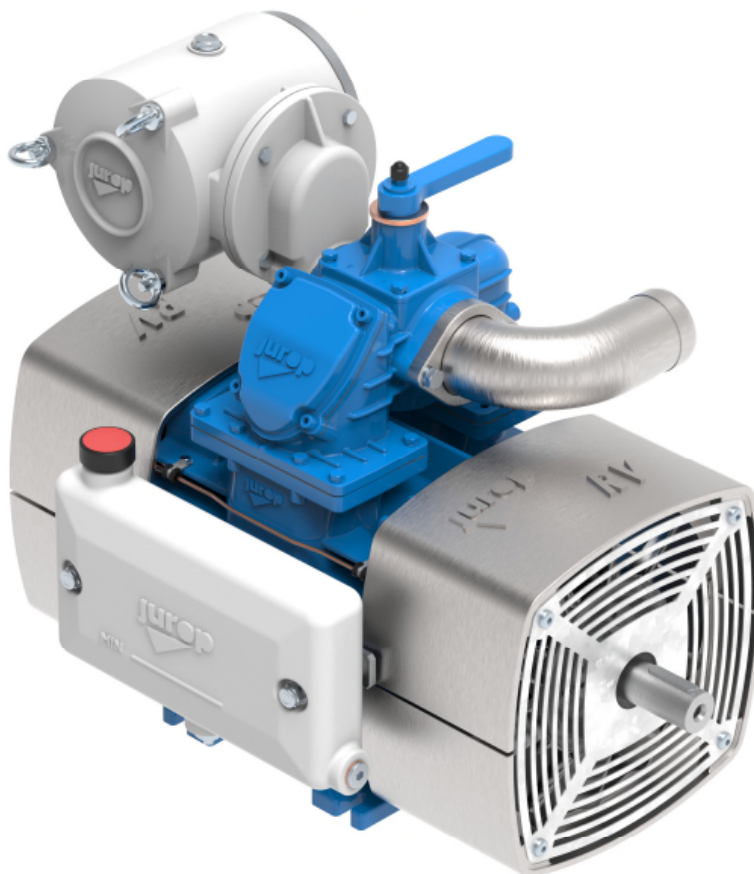
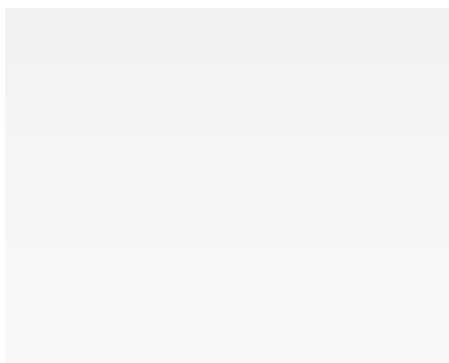




ORIGINAL INSTRUCTIONS



**INSTALLATION, USE AND
MAINTENANCE MANUAL**



2021 – **Juop** – Azzano Decimo (PN)

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1. General warnings

1.1. Introduction

- This booklet contains the necessary instructions for a correct installation, running, use and maintenance of the pump, as well as some practical suggestions for a safe operating.
- The knowledge of the following pages will grant a long and trouble-free operation of the pump.
- Following the instructions below contributes to limiting pump repair expenses by extending its duration, as well as preventing hazardous situations, thereby increasing its reliability.
- If the pump is driven by an hydraulic motor please refer to manufacturer's specific manual.
- It is recommended to:
 - Understand and apply carefully the instructions before running the pump.
 - Keep the booklet at hand and have it known to all operators.
- Below is a brief description of the symbols used in this manual.

	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.
	Suggestions for an environment friendly use of the pump.

- The graphic representations and photographs contained in this manual are there to illustrate the product in the parts that make it up and in specific operating phases. Though the model shown in the manual may differ from the one purchased, the operating principle at the base of the illustrated operating phase is the same.
- Pump has to be fitted with its own tag reporting the following data: Model, Serial number, Year, Max speed, Max pressure.



Pic. 1.1

1.2. Spare part request

- Use only **genuine spare parts** for maintenance and repairs. To order spare parts, provide the following details:

EXAMPLE:

a) The model of the pump (see pump tag):	RV 520
b) The serial number of the pump (see pump tag):	K90001
c) A description of the parts (see parts list):	VANE
d) The quantity (see parts list):	N°5 PZ
e) The code number of the part (see parts list):	16016 069 00

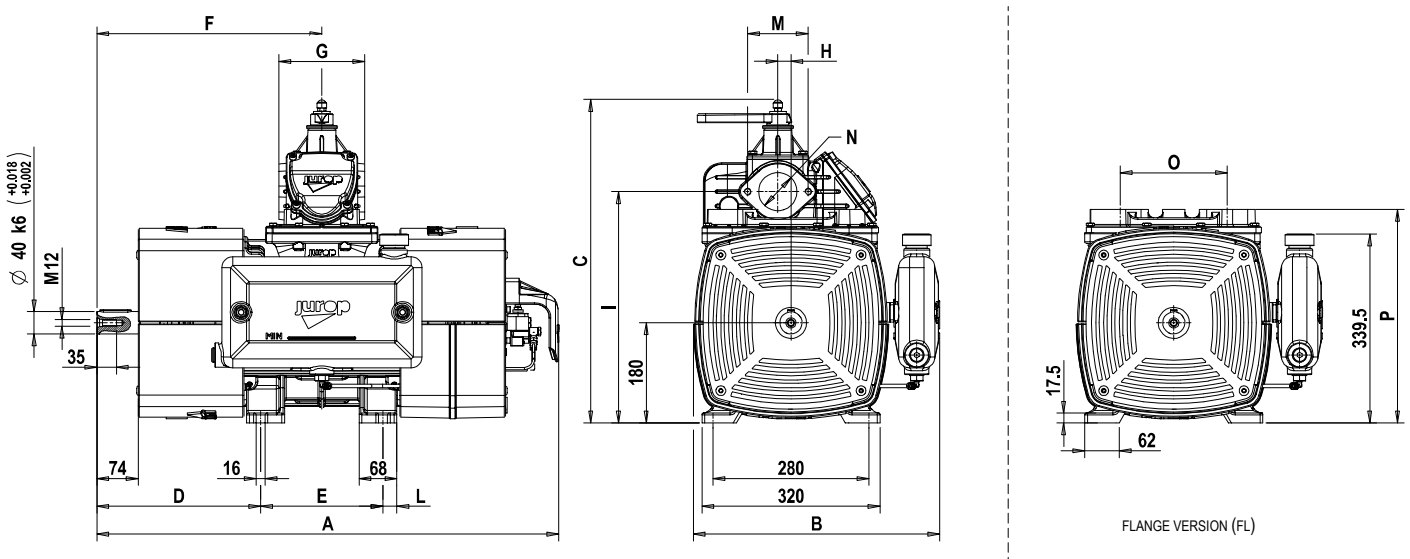
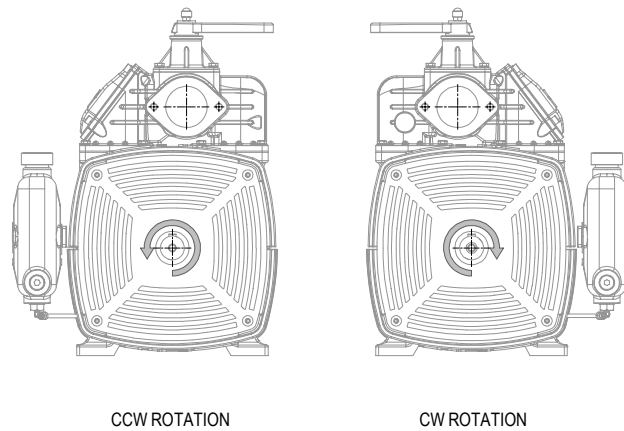
1.3. Warranty terms and conditions

- Compliance with the installation, use and maintenance instructions provided by this manual is **crucial for the recognition of warranty** against defective parts.

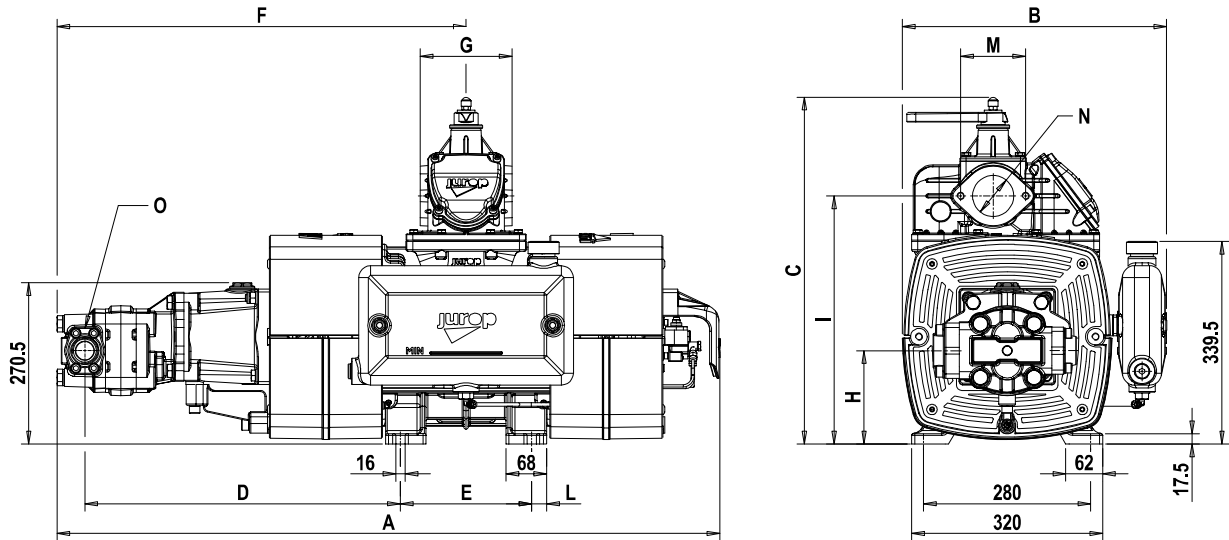
2. Technical data

- The RV models are rotary vacuum pumps cooled by high efficiency contraposed fans. The airflow reduces the temperature of the internal parts normally subjected to wear like bearings, vanes and sealings.
- The RV models are suitable for heavy-duty operation. The pumps are equipped with an automatic lubrication system and a positive displacement pump. The oil tank is side-mounted. The oil piping are made in copper.
- A pneumatic or hydraulic version of the built-in 4-way vacuum/pressure manifold is available on request.
- The non-return valve is integrated in the pump manifold.
- There are two tangential vanes inspection ports, on the pump housing.
- The RV models are available in flanged version (FL).
- Drive system:
 - Direct with smooth shaft;
 - With hydraulic motor.

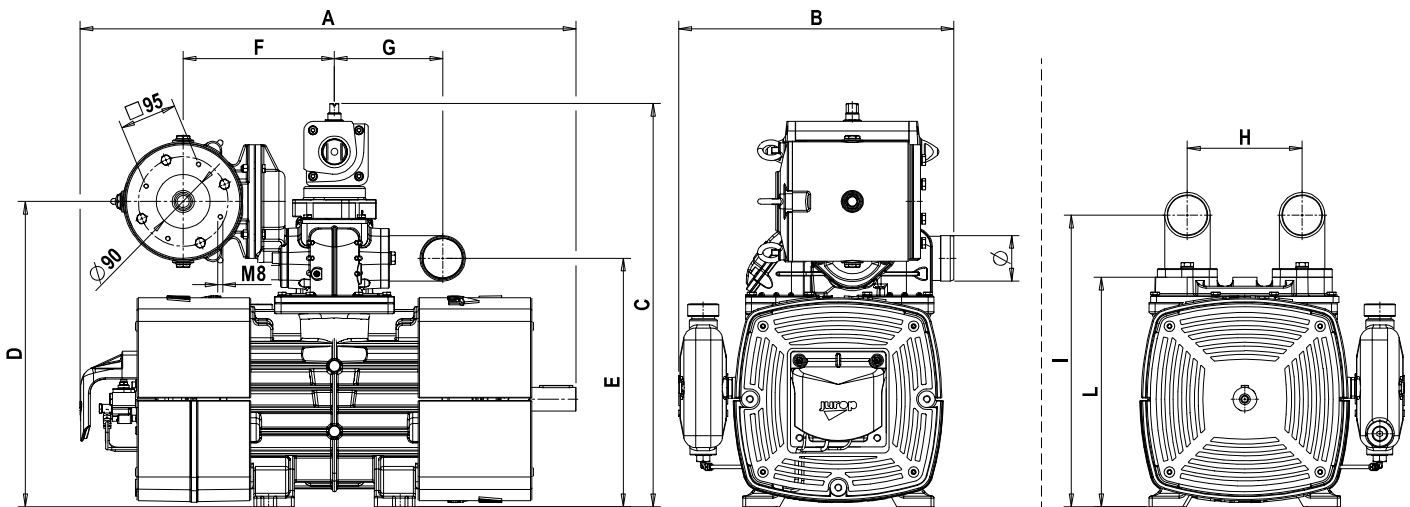
2.1. Dimensions and arrangement



	[mm]	A	B	C	D	E	F	G	H	I	L	M	N	O	P
RV 360		830	442,5	581,5	294	220	404	154	23,5	416	25	109	Ø 69	192	384
RV 520		975	438,5	605	334	286	477	162	15,5	429	29,5	95	Ø 84	210	392

RV with hydraulic transmission


	[mm]	A	B	C	D	E	F	G	H	I	L	M	N	O in	O out
RV 360 HYD		1111	442,5	581,5	529	220	685,5	154	156	416	25	109	Ø 69	G 1 ³ / ₄	G 1 ¹ / ₂
RV 520 HYD		1239	438,5	605	527	286	741	162	149	429	29,5	95	Ø 84	G 3/4	G 1"

RV with accessories


FLANGE VERSION (FL)

	[mm]	A	B	C	D	E	F	G	H	I	L
RV 360		830	460,5	675	511	416	253	181	192	488	384
RV 520		975	463,5	696,5	477	429	279	175	210	486	392

	Ø	RV 360	RV 520
ADJUSTABLE CONVEYOR	76	•	
	80		•
	100		•
FIXED CONVEYOR	76	•	
	80	•	•
	100		•

2.2. Performances

Performances			RV 360	RV 520
Air flow under free air condition		l/min	10200	14700
		m ³ /h	612	882
Air flow 60% vacuum rate		l/min	9400	12915
		m ³ /h	564	775
Max. vacuum at continuous duty		%	80	80
Max. vacuum		%	95	95
Power required at free port		kW	14 kW	19
Power required at max. vacuum		kW	11 kW	16
Airflow at 0.5 relative bar (1.5 abs.)		kW	18	24
Airflow at 1.0 relative bar (2.0 abs.)		kW	22	30
Max. relative pressure		bar (bar abs)	1 (2)	1 (2)
Sound pressure level Lp(A) - Pump with exhaust silencer; distance: 7m in open field	vuoto 60%	dB(A)	74	76
Oil consumption		g/h	140	160
Oil tank capacity		l	4	4
Weight	RV...D	kg	175	234
	RV...D (FL)	kg	166	210
	RV...HYD	kg	205	250
	RV...HYD (FL)	kg	196	240

REFERENCE CONDITIONS

Conveyed gas: air	Vacuum condition: atmospheric discharge.	Absolute reference pressure: 1013mbar
Ambient reference temperature: 20°C	Vacuum functioning: free outlet	Pressure condition: atmospheric suction.
Vacuum pump operating at max. speed	Actual performance may vary of +/- 5%.	

Flow / Power

Model	Free ports	Vacuum rate							Abs. pressure		
		20%	40%	60%	70%	80%	90%	1,5 bar	1,8 bar	2,0 bar	
RV 360	m ³ /h	612	605	595	564	453	310	106	570	550	540
	l/min	10200	10080	9913	9400	7550	5166	1766	9496	9163	8997
	kW	14	13,5	13	12,6	12,3	11,9	11,2	18	20,5	22
RV 520	m ³ /h	882	860	840	775	670	480	150	780	740	712
	l/min	14700	14330	14000	12915	11165	8000	2500	13165	12330	11865
	kW	19	18,2	17,7	16,9	16,4	16,2	16,1	24	27,5	30

Data at nominal speed

Actual performance may vary of +/- 5%.

2.3. Sound pressure level

Lw (A)			
Noise power of the only pump, without drive transmission suction group, mufflers.		[dB(A)]	
RPM	VACUUM / PRESSURE	RV 360	RV 520
NOMINAL SPEED	vac 80%	89	91
	Δ press 0,6 bar	100	102

2.4. Usage limitations

Modello	Max. Speed – Operating speed (RPM)			P ₂ (bar ABS)	T ₂ (°C)	T ₂ - T ₁ (°C)	Room Temperature
		Ordinary					
RV 360	800 rpm	1100 rpm	1300 rpm	2,0 bar	180°C	150°C	-20 / +40°C
RV 520	800 rpm	1100 rpm	1300 rpm	2,0 bar	180°C	150°C	-20 / +40°C

P₁: absolute pressure during suction

P₂: absolute pressure during delivery

T₁: temperature during suction

T₂: temperature during delivery

2.5. Lubrication

Recommended oils: *Mineral oil anti-wear*

Room T°	Viscosity	ENI	ESSO	SHELL	TOTAL	MOBIL	BP	TEXACO	Q8
Under 10°C	ISO VG 46	Acer 46	Nuto 46	Morlina S2 B 46	Drosera MS 46	Nuto H 46	Bartran HV 46	Rando HD 46	Shubert 46
Over 10°C	ISO VG 150	Acer 150	Nuto 150	Morlina S2 B 150	Drosera MS 150	Nuto H 150	Bartran HV 150	Rando HD 150	Shubert 150

3. Safety and accident prevention



Attention:
Carefully apply these prescriptions.

3.1. General recommendations

- When transporting the compressor use proper slinging. Store the compressor in stable places.
- Installation and maintenance must be carried out with the unit totally disengaged from its drive system and must be performed by qualified personnel.
- Use adequate clothing (avoid ties, loose sleeves, necklaces and so on) and suitable protection equipment (gloves, protection glasses, boots...).
- Before each maintenance operation, stop the pump and restore the atmospheric pressure.
- Make sure that all the parts of the unit are idle and cool, before performing any maintenance operation.
- To prevent errors and hazardous situations, establish what each operator is responsible for in the different maintenance operations.
- Do not start the machine if the protection devices provided for transmissions are removed. Replace damaged part.
- Final manufacturer must make the transmission inaccessible by means of a fixed guard or interlocked movable guard.
- Operators working nearby must avoid prolonged exposure to the noise emitted by the aspirator, if not equipped with the proper ear-protection devices (IPDs recommended: ear protectors).
- When the pump is running, some parts may reach very high temperatures (above 70°C). Use all necessary precautions to avoid contact.
- Avoid accidental suction of solids: solids may be projected at high speed through the exhaust manifold and cause injuries. A filter must be mounted on the suction line (Mesh 55).
- Pressure relief valve: point the air flux away from the operators.
- Do not use the aspirator over its designed limits: the machine may be damaged and the operator may be injured.



Do not exceed the speed and the power supply parameters indicated in the technical tables (see par 2.2 – 2.4).

- Based on the final use of the decompressor, the insertion in the housing machine and the typology of the same, the designer of the

housing machine must apply safety signals (pictograms) to warn the operator on the risk still present. These pictograms essentially refer to three categories:

- Signals prescribing the use of Individual Protection Devices (IPDs) such as, in this case, the use of gloves and ear protectors.
- Signals indicating to pay particular attention to the dangers related to the machine's components, such as: risk of dragging in the transmission equipment and contact with hot surfaces.
- Signals indicating specific parts of the machine for an easier identification, such as: greasing points, oil tanks, etc.

3.2. Intended use

- The vacuum pumps RV are designed to convey filtered air into systems for the vacuum production (example: systems for the suction of powders or liquid wastes). Any other usage shall be considered improper.
- Do not sack toxic substances and inflammable or explosive gasses, since the internal components of the pump may reach high temperatures.



Avoid suction of toxic (poisonous) explosive or flammable gasses because internal components may reach high temperatures.

- Avoid suction of liquids or solids; they can seriously damage the pump.



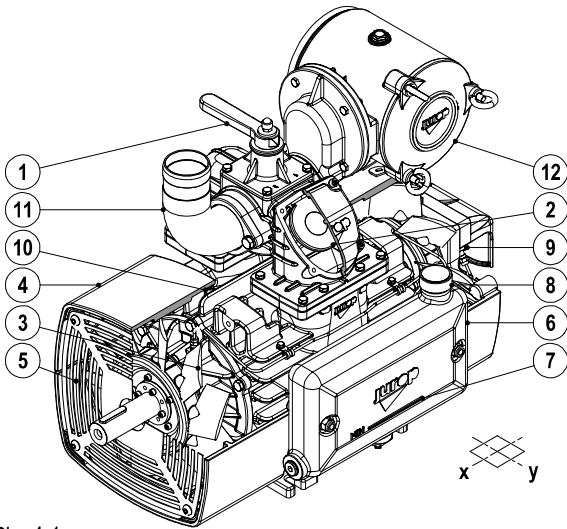
Attention: liquids or solids infiltrations can seriously damage the pump.

- Do not run the pump over its designed operating limits (see par. 2.5): it may break and transmission can be damaged.

3.3. Conveyed fluids

- RV are suitable for conveying filtered air. Before conveying other kind of gases, verify compatibility with pump's characteristics.
- The machine was not designed and built to operate in environments with potentially explosive atmosphere (outdoor or indoor).
- Please contact JUROP's Technical dept. if necessary.

4. Installation



Pic. 4.1

1.	Manifold
2.	Non return valve
3.	Girante raffreddamento
4.	Air cooling conveyors
5.	Fan protection
6.	Oil Tank
7.	Oil level
8.	Oil filler cap
9.	Lubrication pump
10.	Vane inspection ports
11.	Fixed / turning conveyor (upon request)
12.	Suction filter kit (upon request)

4.1. Checking upon receipt

- When the goods are delivered, make sure that all parts 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.

4.2. Storing in the warehouse

- If the pump will not be installed inside a short time after delivery:
 - Remove the guards from the ports and spray a film of protective oil over the inner surfaces of the body, rotors and sides. Then attach again the guards;
 - Store in a closed and dry place. Renew the preserving oil periodically.
- To temporarily store a used pump, follow the instructions below:
 - Thoroughly clean the pump.
 - Equip the pump with suitable anti-corrosion protection.

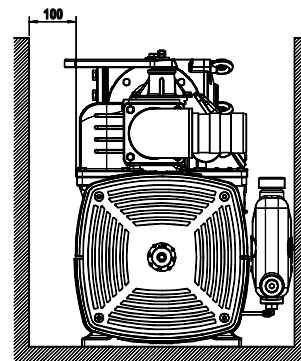
4.3. Movimentazione e installazione

- Before each movement, verify that the lifting equipment has a suitable capacity (check the weight of the decompressor, possibly showed in this manual, in the paragraph 2.2).
- Do not lift the packaging or the machine when moving more than 50 cm from the ground. Proceed with the final lifting only near the installation point.
- Harness the machine with suitable straps / chains near the main body, paying attention to the position of the mass centre of gravity to ensure the load stability.

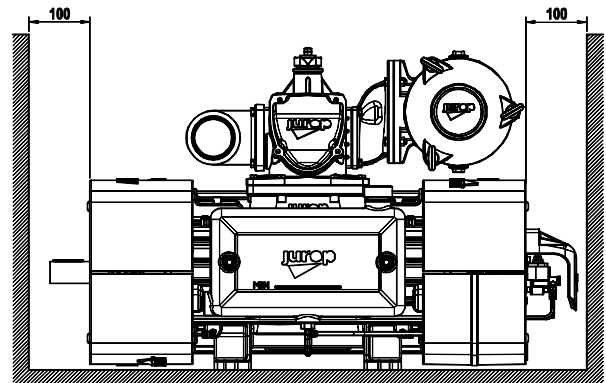
Warning: do not stand under the machine when it is lifted during the installation.

4.4. Mounting

- The mounted aspirator must be accessible for maintenance and firmly fixed on a frame or angled base with a 3° max inclination on X and Y axes (see Fig. 4.1). The structure must be fit to avoid flexions or vibrations.
- Provide enough space for air ventilation and disposal of heat when pump is running. See Fig. 4.2 and 4.3 for indication of the distance to be respected.

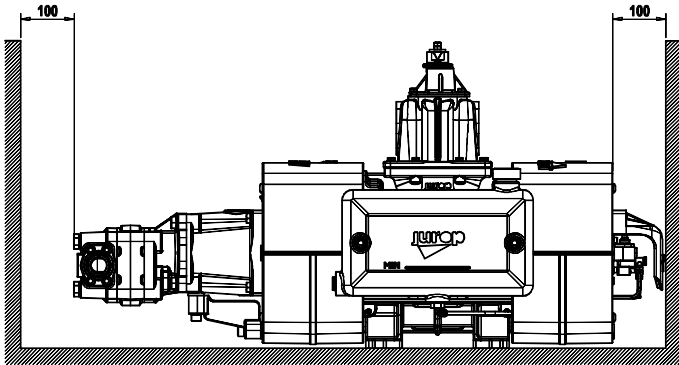


Pic. 4.2



Pic. 4.3

- Provide the necessary space to reach all points of lubrication control (oil level), and the oil tank filler cap, the lever of the 4-way switch, vanes inspection ports.
- The oil tank is mounted on the suction side of the housing. Thus, the rotary direction determines the pump overall dimensions. See also paragraph 2.1.
- In case of RV with hydraulic motor, provide the necessary space to disassemble the motor itself and proceed with joint lubrication.



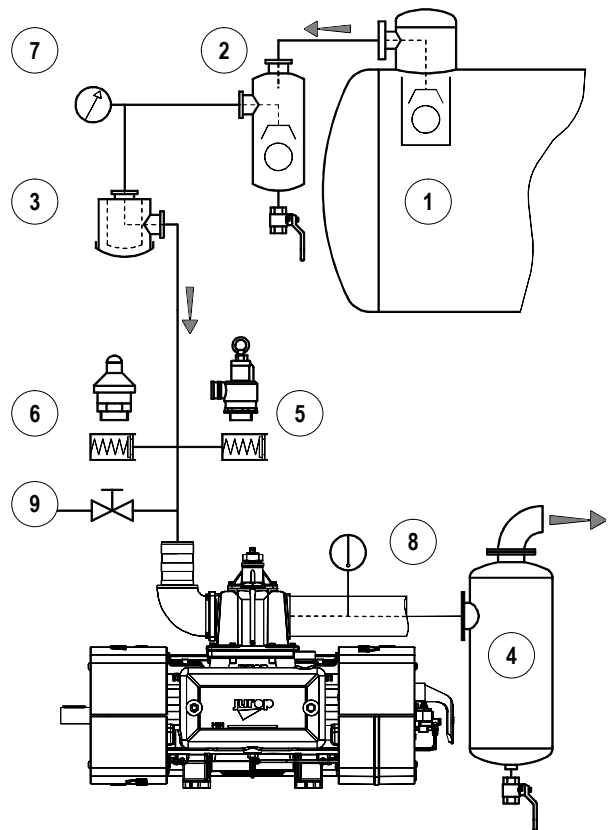
Pic. 4.4

- In the event that the decompressor is electrically isolated, connect it to the ground or make it equipotential with the housing machine. Check that the paint does not prevent its passage.

4.5. Vacuum - pressure line

- See figure 4.5.
- 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. 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 (Pos. 9): 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.

- Thermostat (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.



Pic. 4.5

1	Primary shutoff	6	Vacuum relief valve
2	Secondary shutoff	7	Manometer -1 / +3 bar
3	Suction filter	8	Thermostat
4	Silencer – oil separator	9	Venting shutter
5	Overpressure safety valve		

4.6. Vacuum-pressure inverter: remote control actuators

- A specific design of the vacuum-pressure diverter available on request enables the application of a pneumatic or hydraulic angular actuator (90°).
- See the exploded view at the end of the manual for spare parts.

	Pneumatic actuator	Hydraulic actuator
Fluid	Filtered, dried compressed air	Hydraulic oil ISO-L-HM
Filtration	ISO 8573-1 classe 4 (15 micron)	ISO 4406 21/19/16
Temperature	°C -20 ÷ +80	-20 ÷ +80
Rated pressure	bar 5.6	150
Maximum pressure	bar 8.4	200
Supply holes	G 1/4	G 1/8

Hydraulic actuator installation

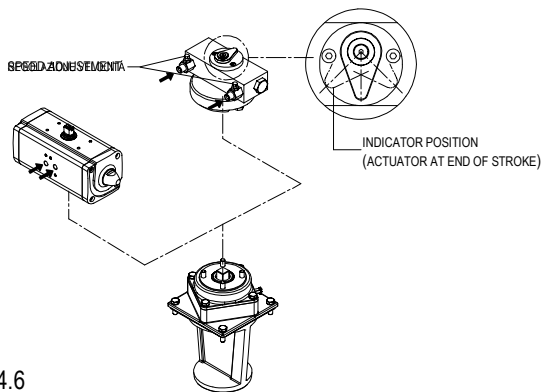
- Adjust movement speed using the two built-in valves.
- Use a closed-centre distributor or apply a block valve.

Pneumatic actuator installation

- Adjust movement speed by applying two unidirectional flow control valves.

For both actuators

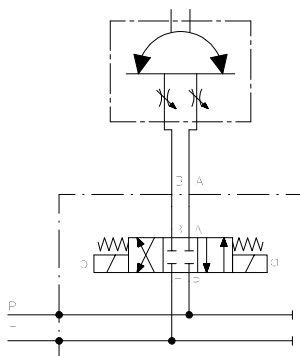
- Adjust speed: full rotation should not take less than 1 second.
- Fluid filtration: ensure a level equal to or greater than the recommended value.
- In the event of a (hydraulic or pneumatic) supply failure, the suction unit inverter will remain in the same position it was when the failure occurred.



Pic. 4.6

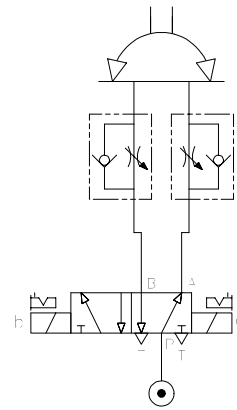
Maintenance

- The diverter is adjusted before shipment and does not usually require further adjustments.
- Diverter lubrication:
 - Use NLGI 2 Lithium grease. Quantity: 80-100 grams for 1000 working cycles.
 - A bleeder hole covered by a filter is preventing the hole to overfill. Clean the filter whenever clogged.
- Hydraulic actuator: the control valves are equipped with an internal metal filter. Disassemble and clean if movement stops.
- Pneumatic actuator: for non-dried air, use temperature 0 ÷ +80°C.
- The following figure shows a possible schematic view of a correct hydraulic connection.



Pic. 4.7

- The following figure shows a possible schematic view of a pneumatic connection.



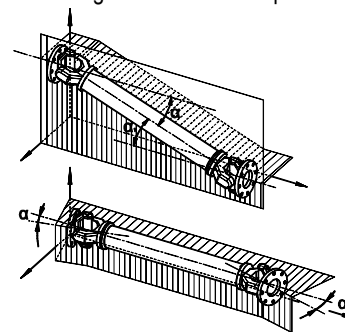
Pic. 4.8

- In case of interruption of the pneumatic or hydraulic supply, the inverter of the suction unit remains in the same position it was when the failure occurred

4.7. Pump mounting - Drive connection


A) Cardan shaft drive

- Use telescopic cardan shafts.
- In order to achieve a uniform motion of the driven shaft, the following requirements must be met (see Pic. 4.8):
 - 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.




Pic. 4.9

- It is also recommended working with limited articulated joint angles (max 15° at 1000 rpm and max 11° at 1300 rpm) and disengaging the transmission for those operations requiring great angles (steering or lifting).

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

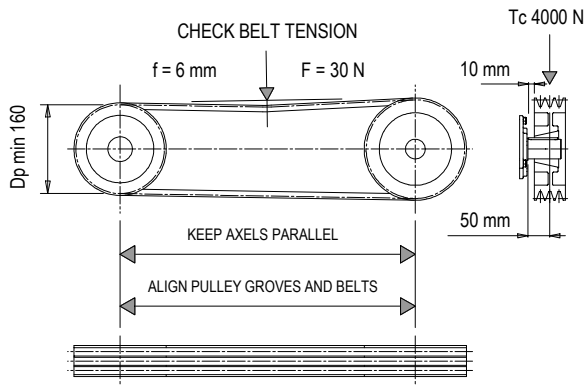
- Use the cardan guard supplied with the pump, by fixing it to the pump itself.

 Use the cardan guard supplied with the pump, by fixing it to the pump itself. In any case, the installation, by the final installer, must comply with the current EC accident prevention regulations and must be compatible with the geometry of the protection cap supplied with the machine.

• The protection must not be removed; in case of removal, it is the responsibility of the final installer to provide for suitable guards according to the assembly.

• It is the responsibility of the final installer to provide for suitable guards, in presence of transmission shafts exposed during normal operation.

B) Belt drive



Pic. 4.10

- Install a suitable pulley on the smooth shaft as close as possible to the pump: 50 mm. Taper lock pulley are suggested.
- Apply an adequate belt tension (see manufacturer's data). See list below (T. 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. Provide protections, which ensure adequate ventilation.
- A limited speed ratio will extend the belts life and reduce stress on the shafts. When possible prefer:
 - Pulleys with a pitch diameter bigger than the one indicated, Dp=180mm;
 - Engines or power take-offs with a speed similar to the one of the pump.

	RV 360	RV 520
Max speed (rpm)	1300 rpm	1300 rpm
T. Max	4000 N	4000 N
L. Max	50 mm	50 mm
Drive min. pulley p. diam	160 mm	160 mm
Nr. Grooves	3	4
Belts	XPB	XPB

C) Hydraulic drive

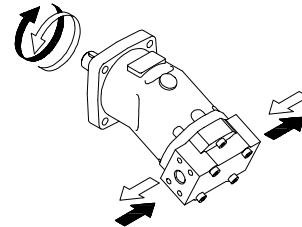
	RV 360		RV 520	
	Vac. Max.	0,5 bar rel	Vac. Max.	0,5 bar rel
Displacement	61 cc/rev		72 cc/rev	
Operating pressure	130 bar	160 bar	150 bar	185 bar
Flow	83 l/min (1300rpm)		99 l/min (1300rpm)	
Max pressure draining line	5 bar		5 bar	
Max. pressure motor exhaust	5 bar		5 bar	
Max. pressure	180 bar		250 bar	

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

Temperature	Optimum viscosity ale	Max. viscosity allowed
-20 / +80 °C	12 – 100 cSt	750 cSt

• **Filtration:** class 19/16 contamination according to ISO 4406 to be obtained with a $\beta_x = 75$ filter.

• **Check circuit connections:** they must be applied in the same rotation direction as that indicated by the arrow on the pump front conveyor protection.



Pic. 4.11

• **Draining:** connect directly to the tank above the maximum oil level. Operating without draining line may damage the motor.

• **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.

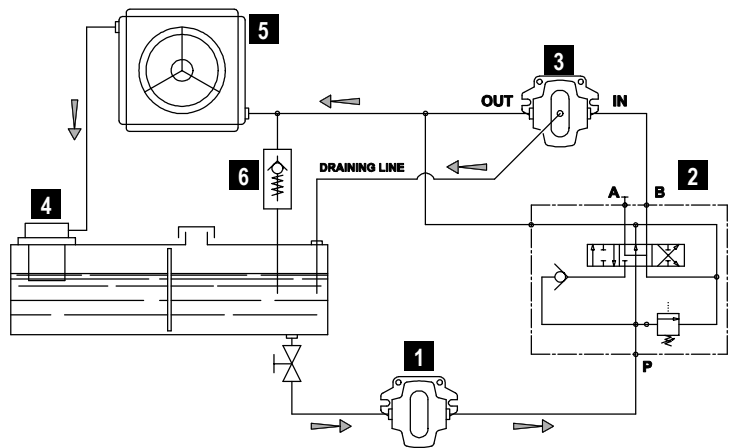


Fig. 4.12


1	HDR pump	4	Oil filter
2	Distributor	5*	Heat exchanger
3	HYD motor	6*	Safety valve

* optional components

• **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.
- The machine/system manufacturer is responsible for dimensioning the lines.

 **The machine/system manufacturer is responsible for dimensioning the lines.**


5. Start up

5.1. Starting-up of the pump

- Check the side mounted tank oil level.
- Riempire il serbatoio olio sino al livello massimo.
- In order to choose the most suitable oil, see paragraph 2.6.
- 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.


 **This vacuum pump is designed to work at maximum speed, but for longer operating we recommend the pump be run at working speed (see par. 2.5).**

- To reduce the vacuum rate to 80% max.
- Prepare adequately transmission.

5.2. Operating precautions


- Run the vacuum pump at a room temperature of -20°C e +40°C.
- Running at continuous duty: see paragraph 2.2.
- Do not make the vacuum pump overheat. Maximum air temperature on exhaust (or delivery) side: 160- 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 according to list at paragraph 2.4.
 - To start running the pump again only when temperature at exhaust is below acceptable values.
 - Do not operate the pump without lubrication: it may cause quick wear and possible breakdown of vanes.
 - Do not start running the pump under load: that causes stress to the drive system and the hydraulic motor.
 - 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: it may break the vanes.
- Do not convey the exceeding delivery outlet towards the suction port, otherwise it will suck warm gas.
- In vehicles do not direct compressor's discharge to the intake of the engine.
 - Control the air flow by adjusting the rotation speed: do not use the pressure relief valve to discharge the exceeding flow.
 - Once the needed vacuum rate has been reached, we recommend reducing the vacuum pump speed to its working speed (see par. 2.4): this allows keeping the achieved vacuum/pressure rate constant. The pump speed can also be reduced to values lower than the working speed during the tank discharging phase (with the 4-way valve 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.

 **Once the needed vacuum rate has been reached, we recommend reducing the vacuum pump speed to its working speed.**

• After operation in dusty environments, after accidental sucking of liquids inside the pump or before a long inoperativity period it is recommended to wash the pump inside according to the following procedure:

1. Before washing the pump, be sure that it has cooled down. To obtain this in a short time, it is possible to run the pump for a few minutes at zero vacuum conditions, or stop it at all;

 **Attention: Do not carry out this operation on very hot pumps (for example after a working day) until they have cooled down.**

2. Use 1-2 liters of water mixed with a non-flammable detergent. We suggest some product like Henkel Bonderite C-NE 5225: 5% concentration in water. This detergent grants a good protection against rust and oxidation.
3. Use one of the openings placed in the vacuum line (closet on the pump) to suck some water mixed with detergent.
4. Start the pump at low speed leaving opened all the suction valves in the tank, in order to keep low the vacuum rate (max vac. 10-20%). Let the detergent mix entering the pump very slowly.
5. The detergent mix stays suspended in the pump inside, before being expelled through the exhaust silencer.
6. After keeping the pump speed for a while to make the product reaching the internal parts, it is necessary to dry the pump preventing oxidation. When the detergent mix is finished, continue running the pump at the lowest possible vacuum rate for a few minutes, then close venting and suction valves up to 50-60%

maximum, for a couple of minutes. With this operation the pump will dry from the heated air and protected from the chemical attack of the detergent.

- Washing the pump with this detergent guarantees a protection after some days of inoperativity. If the pump is not used for more than two weeks, after having washed and dried the inner parts as described above, it is recommended to suck slowly 200 cc anti-rust and water-repellent protective oil (or, if not available, a very fluid gear oil).

Attention: do not carry out also this operation on very hot pumps (for example after a working day) until they have cooled down.

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

6. Maintenance

6.1. Ordinary maintenance

- Any interventions must be performed when the machine is cold, stopped and switched off.
- Installation and maintenance must be operated only by qualified personnel wearing the proper clothes and the necessary tools as well as protection devices.
- Use suitable protection equipment (gloves, protection glasses, boots...)
- In the following table summarizes the main controls to be performed and the frequency of intervention.

Operating Condition	Maintenance Area	Check	8H	50H	500H	1000H
OPERATING	Vacuum Line	Operating pressure				
		Check safety valve				
	Transmission / Pump	Rotation speed				
		Sound pressure level (also HDR motor)				
STANDSTILL	Vacuum Line	Drain the oil gathered in the exhaust separator				
		Clean filter and vacuum line shutoff				
		4-way changeover valve: check and lubricate				
		Clean suction filter				
	Pump	Side mounted tank oil level (1)				
		Clean fan protections				
		Check vanes wear				
		Pump's inner washing (2)				
	Overall	Greasing				
		Check cardan shaft drive				
Check transmission pulley						
Swing valve wear check						

(1) In order to choose the most suitable oil, see paragraph 2.5.

(2) After operation in dusty environments, after accidental sucking of liquids inside the pump or before a long inoperativity period it is recommended to wash the pump inside. See paragraph 5.2.

Checking lubrication

- Check the correct operation of the system / lubrication circuit.

If the pump is running without lubrication, the internal components may quickly damaged due to overheating. Stop the vacuum pump and check the oil level and the lubricating pump.

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. See Fig. 6.1.

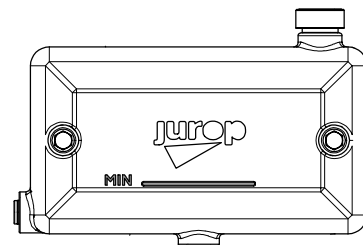


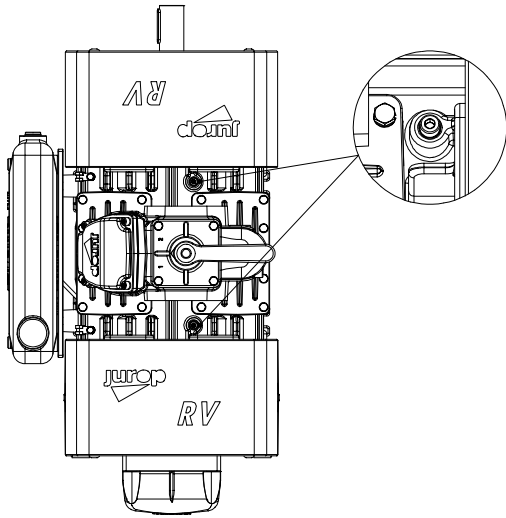
Fig. 6.1

- Tank capacity: 4l.
- Use pure fresh oil.

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

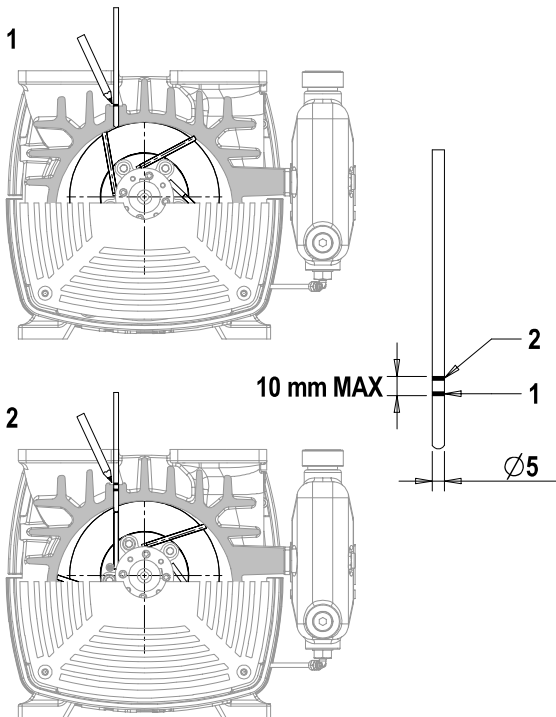
Checking the vanes wear

- Unscrew the vanes wear check-plug on the front flange. Pic. 6.2.
- Turn the shaft by hand until vanes appearance.
- Vanes usually slip on seat bottom due to gravity. Check their right entry in the seat.



Pic. 6.2

- Inserire, come in Fig. 6.3, un’astina Ø 5 mm con l’estremità conica verso l’interno della pompa (astina in dotazione).
- Insert a Ø 5 mm stick until it touches the rotor and then mark (see Fig. 6.3).
- 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.



Pic. 6.3

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

Replace the vanes when their wear exceeds 12 mm (L – L min): they may break. Replace all vanes at the same time.

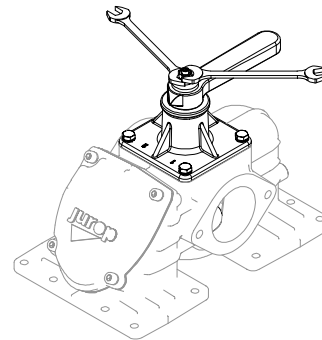
- Replace the cap after the measurement.

6.2. Extraordinary maintenance

- Except for the cases described below, extraordinary maintenance on a RV must be carried out by specialized personnel only; otherwise the guarantee will be invalidated.
- All extraordinary maintenance interventions must be carried out when the machine is cold, stopped and switched off. Implement the safety instructions reported in the “Safety and accident prevention” Chapter, before performing any maintenance operation.

Follow the safety prescriptions as described in Cap. “Safety and accident prevention”.

Adjusting the 4-way valve

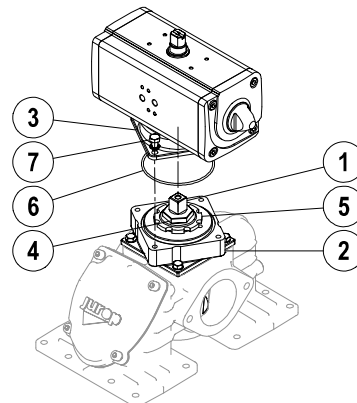


Pic. 6.4

- For pumps equipped with handle for manual operation or actuator.
- Adjust the screws to avoid the valve blocking in its seat (see Fig. 6.4).

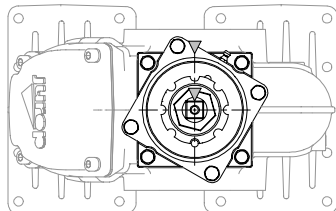
Attention: do not exceed with the adjustment: possible vacuum loss.

Adjusting the pneumatically operated 4-way valve

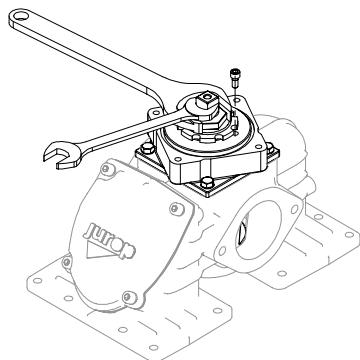


Pic. 6.5

- 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 (7) which fasten the top cover (3) to the inferior support (2).
- 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.

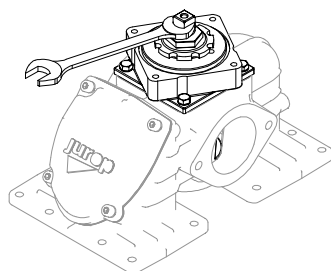


- Turn the valve until one of the cock regulation ferrules (P6) coincides with one of the threaded holes on the inferior flange (P2). Block temporarily the nut ferrule with a screw.
- Hold the valve in place with a 17 mm spanner and loosen the nut (P4) over the ferrule by 1/2 - 3/4 turn with a 36 mm spanner.



Pic. 6.6

- 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.

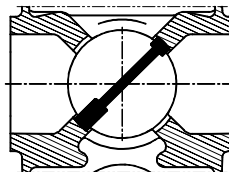


Pic. 6.7

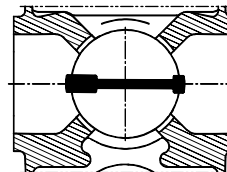
- Remove the screw which temporarily blocks the ferrule and check for the correct rotation of the valve by adjusting the shaft frame. Repeat the valve adjustment, if necessary.

Attention: 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.



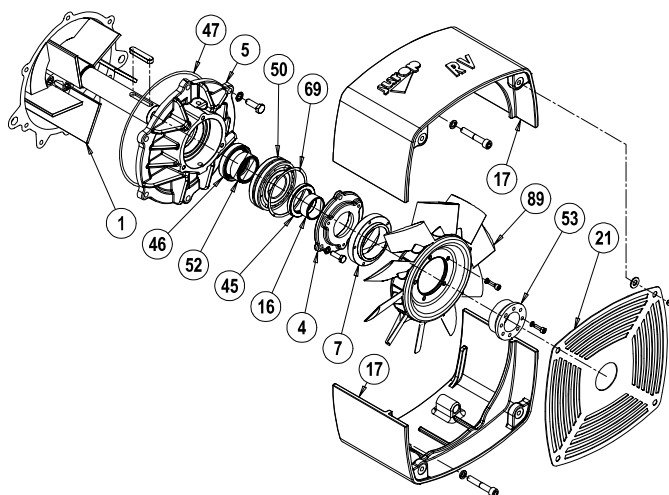
CORRECT POSITION



INCORRECT POSITION

- 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 (6). Fasten the 4 screws.

Replacing the vanes



Pic. 6.8

Pos.	Code	Description	Q.ty
1	1601605900	VANE (RV 360)	5
	1601606900	VANE (RV 520)	5
16	1626001100	FRONT OIL SEAL BUSHING.	1
35	1680707300	SEAL CAP GASKET	1
45	4022200044	OIL SEAL 65X45X8	1
46	4022200113	ROTOR SEAL 70X55X15	1
47	4022200309	O-RING 4875	1
51	4023130035	BUSHING 55X45X22	1

- Remove the vacuum pump from its bearing frame and wash it before disassembling.
- We recommend that you work on the pump front.
- The following drawings refers to RV520. For RV360 see spare part data sheet drawings at the end of this manual.
- Material that is subject to wear: replace.

Disassembling

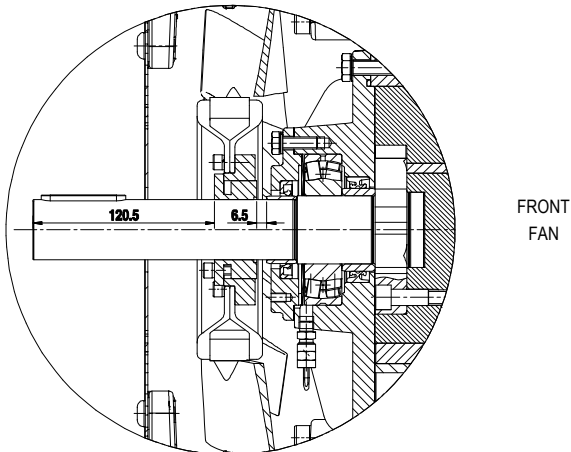
- Disconnect the drive system, if this is the case, and check conditions.
- Hydraulic drive: mark the position of the driven shaft on the pump shaft.
- Remove the conveyor protection (21).
- Remove the aluminium conveyors (17).
- Loosen the 4 screws which blocks the locking set (53) and remove the cooling fan (89) with the hub (7).
- Remove the seal cap (4). Do not lose compensation ring (69) and seal cap gasket (35).
- Remove the vacuum pump flange (5) by using the threaded holes to extract it. Do not lose OR-Ring (47).
- Hold the shaft before extracting the flange: the rotor weight must not solicit the internal components.
- Extract the worn vanes (1).
- Complete disassembling;
 - Extract bearing (50) and seal (46) from the pump flange (5);
 - Extract seal (45) from the seal cap (4).

Checking the wear condition

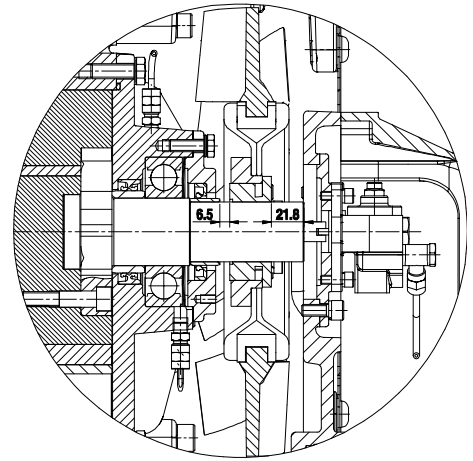
- Check the condition of following parts:
 - Seals and gaskets: they may be worn or have been damaged during disassembling.
 - Bushings: we recommend they be replaced if remarkably scratched.
 - A grinder may be needed to cut them for removal. Prevent iron filings from entering the pump.
 - Check whether 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 (5): insert seal and bearing if they have been previously removed or need to be replaced.
- Seal cap (4): 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.



FRONT
FAN

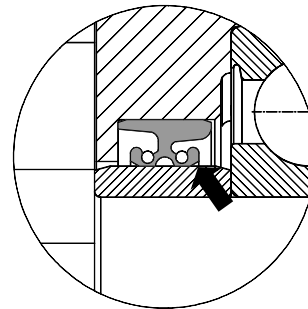


REAR
FAN

Pic. 6.9

- 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 10 Nm coupling.
 - Reassembly the conveyors and their protection.

Do not damage components during assembly by forcing them exceedingly.



Pic. 6.10

- Do not flip the seal ring during rotation of the shaft. Do not leave foreign objects inside the pump.

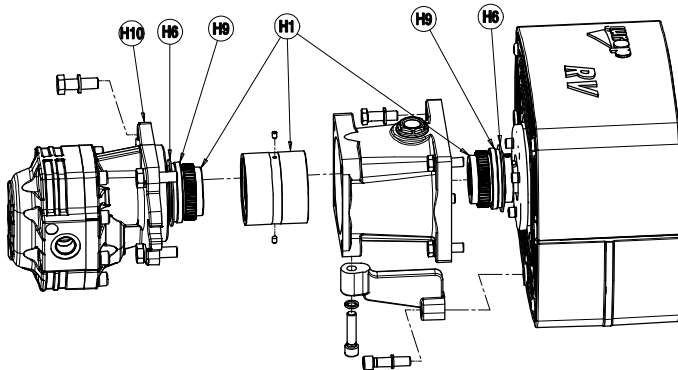
Mounting the hydraulic drive

- We recommend the drive coupling be oiled when vanes are being replaced. See Pic. 6.11.
- However lubricate the drive coupling every 1500 hours.

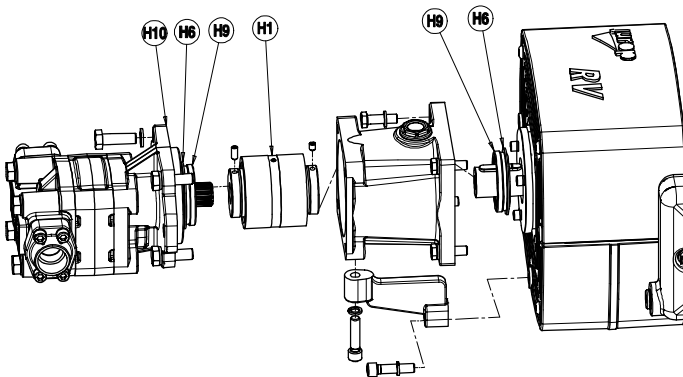
We recommend the drive coupling be oiled every 1500 hours.

- 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.

RV 360



RV 520

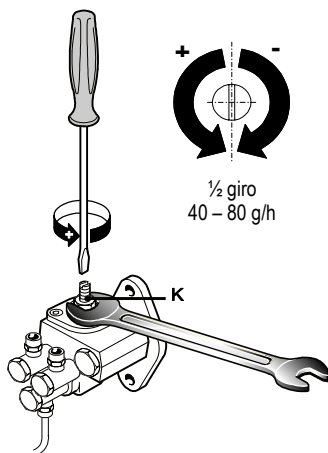


Pic. 6.11

- Mount the coupling (H1) and lubricate internally with NLGI 2 Lithium grease. Provide an adequate quantity of fat, in order to have a medium filling.
- Reassembly the motor without forcing onto the seals (H9).

Adjusting the self-lubricating pump

- The automatic lubricating pump is adjusted by the manufacturer before the shipping.



Pic. 6.12

- If consumption noticeably differs from the indicated value, adjust it as follows:

- Remove the upper protection cover;
- Using a screwdriver and a 10 mm wrench, adjust the adjusting screw (K). Close the nut and remount the upper protection cover;
- It is advisable to turn the screw of ¼ of turn and verify the actual consumption.

Do not reduce oil consumption below the value indicated in par. 2.3 (for functioning at speeds different from the maximum, flow is proportionate to rotating speed).

- ½ turn of the adjusting screw causes a variation in the flow of approximately 40 - 80 g/h, depending on using conditions.

7. Malfunctions: troubleshooting

PROBLEMS

THE VACUUM PUMP OVERHEATS	
Cause	Solution
• Insufficient or absent lubrication	• Verify oil and rings. 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 around the pump. Verify fan conditions. Clean fan protections
• Vacuum and/or exhaust line of insufficient diameter	• Check dimensioning

THE VACUUM PUMP DOES NOT ROTATE	
Cause	Solution
• Broken vanes:	• Clean inner chambers, replace vanes
- due to infiltrated solids	• Check the secondary shutoff and filters of the suction line and clean
- 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

REDUCED PERFORMANCES	
Cause	Solution
• 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	
Cause	Solution
• Insufficient or absent lubrication	• Check and adjust the lubricating pump

8. Scrapping

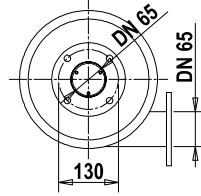
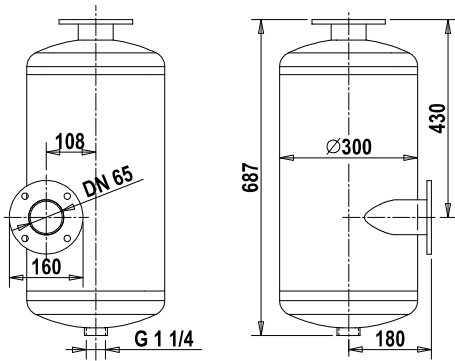
• Recycling materials allow reducing the environmental impact and respecting the environment.

• Before scrapping the machine, the following materials need to be separated and suitably disposed of.

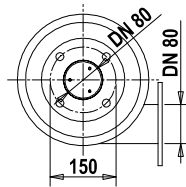
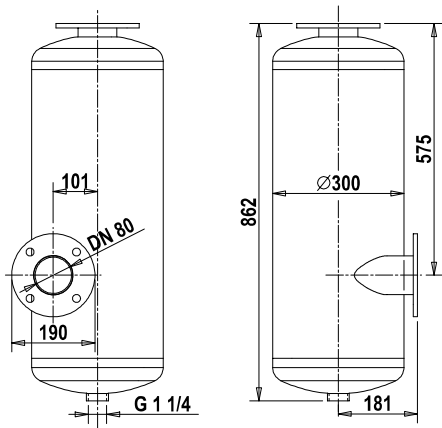


Do not dispose of in the environment. Dispose of in compliance with the standards in force.

Material	Cast Iron	Steel	Alluminum	Copper	Bronze	Vane	Oil	Gasket
RV 360	82	7	9,1	0,1	0,1	0,6	0,6	0,7
RV 520	85	5	7,5	0,1	0,1	0,7	0,5	0,5

9. Accessories
Silencers / Oil separators


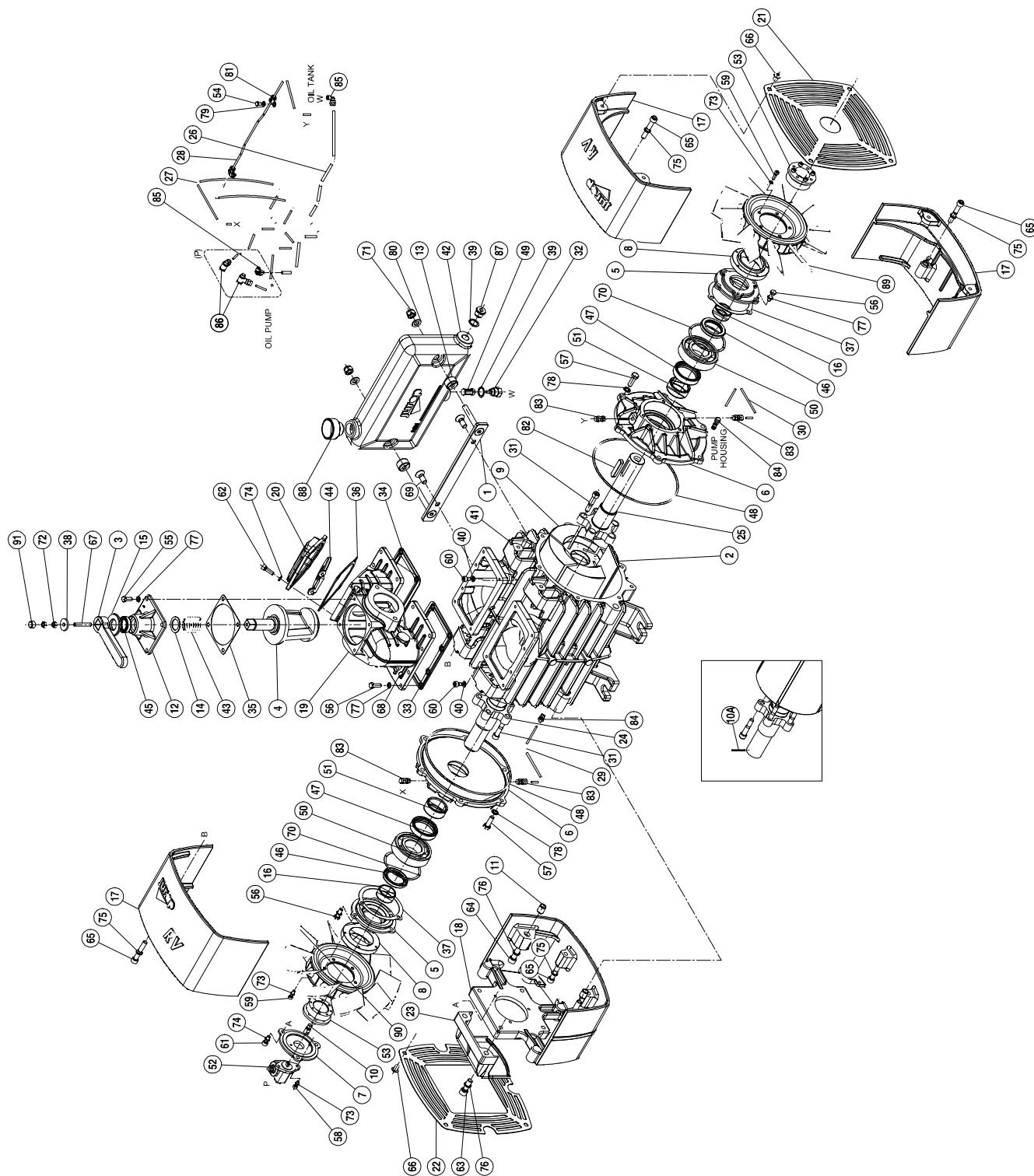
MODEL	RV 360
TYPE	DISCHARGE
CODE	15470 043 00
MAX FLOW	540 m ³ /h
OIL TRAP	3,8 l
WEIGHT	27 kg



MODEL	RV 520
TYPE	DISCHARGE
CODE	15470 D2C B0
MAX FLOW	912 m ³ /h
OIL TRAP	4,4 l
WEIGHT	35 kg

Note: Direct the silencer discharge output away from the silencer suction inlet in order to prevent the input of hot fluids into the injection inlet.

RV 360



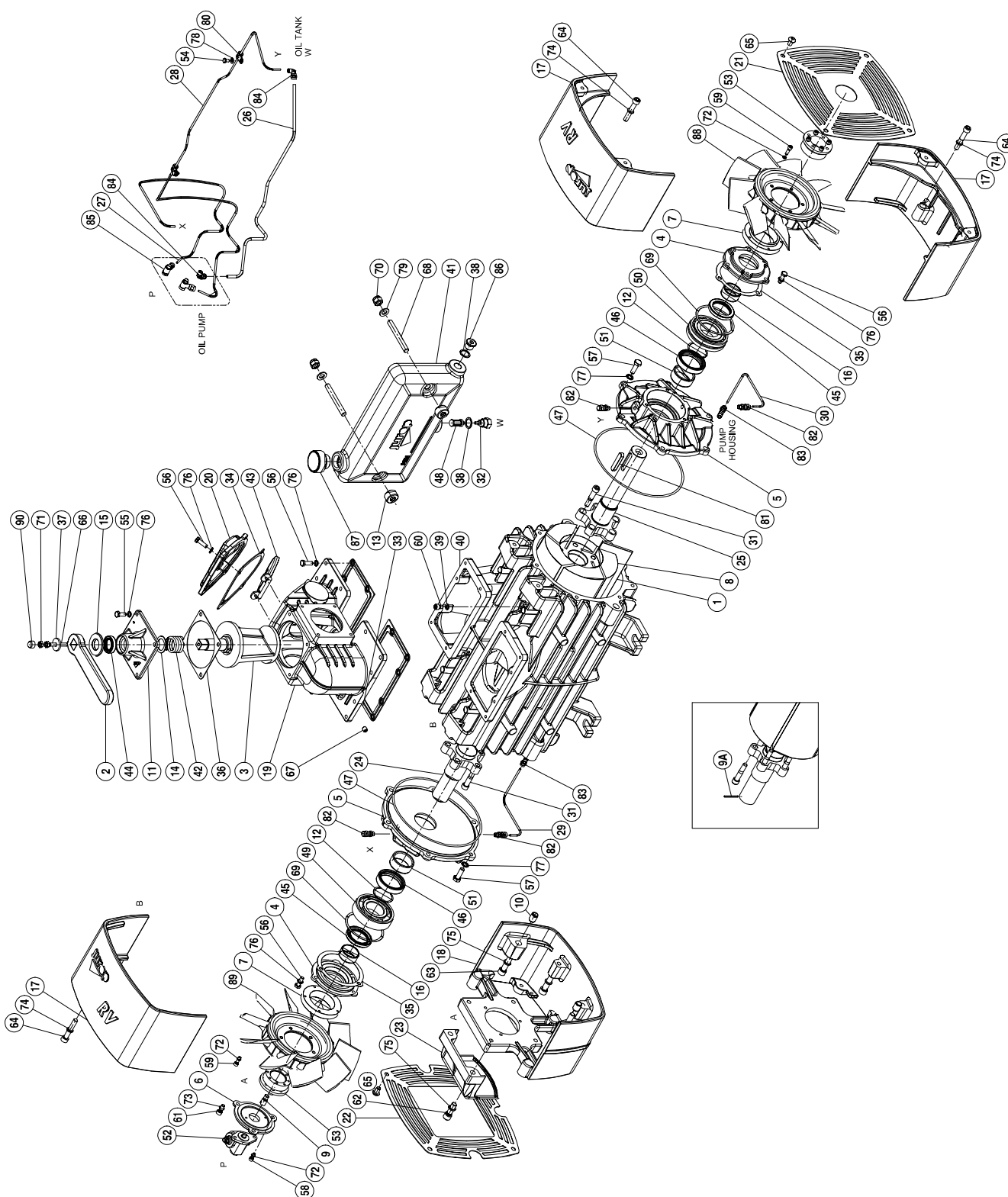
PICTURE SHOWS:
RV 360 CW ROTATION - CODE: A460809440
RV 360 CCW ROTATION - CODE: A460909440 (Box)

RV 360: A46...

RV 360

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1513053300	SIDE MOUNTED OIL TANK SUPPORT	1	53	4025428111	SHRINK-DISK RCK16 40X65	2
2	1601605900	RV 360 VANE	5	54	4026101301	SCREW TE 8,8 M6X10 GALV.	2
3	1605500000	HANDLE	1	55	4026102806	SCREW TE 8.8 M8X20 GALV.	4
4	1608501700	INSIDE VALVE	1	56	4026102807	SCREW TE 8,8 M 8X25 GALV.	18
5	1610508200	FLANGE	2	57	4026102908	SCREW TE 8.8 M10X30 GALV.	12
6	1610513900	FLANGE	2	58	4026121305	SCREW TCEI 8,8 M 6X16 GALV.	2
7	16105CF2B0	OIL PUMP FLANGE	1	59	4026121307	SCREW TCEI 8,8 M 6X20 GALV.	10
8	1611001400	FUN HUB	2	60	4026121401	SCREW TCEI 8,8 M 8X25 GALV.	2
9	1621503500	RV 360 ROTOR	1	61	4026121405	SCREW TCEI 8,8 M 8X20 GALV.	3
10	1622002600	OIL PUMP DRIVE	1	62	4026121407	SCREW TCEI 8,8 M 8X25 GALV.	4
10 A	4026414617	PIN 3X40 (FOR RV360 CCW)	1	63	4026121710	SCREW TCEI 8,8 M 12X35 GALV.	2
11	1622010200	CONVEYOR DOWEL PIN	2	64	4026121719	SCREW TCEI 8,8 M 12X80 GALV.	2
12	1623100000	INSIDE VALVE COVER	1	65	4026121815	SCREW TCEI 8,8 M 10X60 GALV.	8
13	1624042800	SIDE OIL TANK SPACER	2	66	4026122005	SCREW TBEI 10,9 M 10X15 GALV.	8
14	162409YKBO	SPRING SPACER	1	67	4026135415	GRUB SCREW 12,9 M 8X50 GALV.	1
15	1624202300	INSIDE VALVE SPACER	1	68	4026135504	GRUB SCREW 12.9 M 10X10 GALV.	1
16	1626001100	SEAL BUSHING	2	69	4026155909	SCREW TSPEI 10,9 M 12X30 ZINC.	2
17	1627105100	RV CONVEYOR	3	70	4026300025	COMPENSATION RING	2
18	1627105200	RV CONVEYOR WITH SUPPORT	1	71	4026305508	SELF-LOCKING NUT M12	2
19	16275014E0	MANIFOLD	1	72	4026308005	NUT M8 GALV.	2
20	16401098E0	CLAPET COVER	1	73	4026350503	WASHER GROWER 6 GALV.	12
21	1642008300	CONVEYOR PROTECTION	1	74	4026350505	WASHER GROWER 8 GALV.	3
22	1642008400	CONVEYOR WITH SUPPORT PROTECTION	1	75	4026350506	WASHER GROWER 10 GALV.	8
23	1642100200	REAR OIL PUMP PROTECTION	1	76	4026350508	WASHER GROWER 12 GALV.	4
24	1650022100	REAR SHAFT	1	77	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	25
25	1650022200	FRONT SHAFT	1	78	4026351506	WASHER M10 GALV.	12
26	16630040E0	PIPE TANK RV360 RH	1	79	4026357003	FLAT WASHER M6 GALV.	2
	16630041E0	PIPE TANK RV360 LH	1	80	4026357007	FLAT WASHER M12 GALV.	2
27	1663069900	OIL PUMP – REAR FLANGE OIL LINE	1	81	4026426703	RUBBER BAND D.6,5	2
28	1663064400	OIL PUMP – ANTERIOR FLANGE RV360 RH	1	82	4026501006	TAB 12X8X56	1
	1663065000	OIL PUMP – ANTERIOR FLANGE RV360 LH	1	83	4026702000	CONNECTION 4X1/8	4
29	1663064600	REAR RH/ANTERIOR LH HOUSING OIL LINE	1	84	4026706000	CONNECTION 90° 4X1/8	2
	1663064800	ANTERIOR RH/REAR LH HOUSING OIL LINE	1	85	4026706003	CONNECTION 90° 6X1/8	2
30	1663064800	ANTERIOR RH/REAR LH HOUSING OIL LINE	1	86	4026706101	ADJUSTABLE CONNECTION 4X1/8	2
	1663064600	REAR RH/ANTERIOR LH HOUSING OIL LINE	1	87	4026904503	PLUG M20X1,5	1
31	1672001600	SPECIAL SCREW TCEI M10X1,5	10	88	4026910103	PLUG G1	1
32	1673001000	OIL FILTER PLUG	1	89	4028360000	FRONT FAN (FOR RV360 RIGHT VERSION)	1
33	1680611400	DISCHARGE SIDE MANIFOLD GASKET	1		4028360001	FRONT FAN (FOR RV360 LEFT VERSION)	1
34	1680611500	SUCTION SIDE MANIFOLD GASKET	1	90	4028360001	REAR FAN (FOR RV360 RIGHT VERSION)	1
35	1680700200	INSIDE VALVE COVER GASKET	1		4028360000	REAR FAN (FOR RV360 LEFT VERSION)	1
36	16807020E0	CLAPET COVER GASKET	1	91	4029602701	NUT M8 PROTECTION	1
37	1680707300	FRONT FLANGE COVER	2				
38	1685002800	WASHER FE 30X8,5 SP.4 GALV.	1		1892005900	KIT GASKET RV360	1
39	1685100300	WASHER D 20 ALU	2		1892006400	KIT ANTERIOR SHAFT RV360-520	1
40	1685100800	WASHER 8X14X1,5	2		1892006500	KIT REAR SHAFT RV360-520	1
41	1687509300	RV 360 HOUSING	1				
42	1687600000	SIDE OIL TANK	1				
43	1691000000	SPRING	1				
44	18930009E0	CLAPET DN100 WITH OR	1				
45	4022200030	SEAL 41X27X10 GP NBR	1				
46	4022200044	SEAL 65X45X8	2				
47	4022200113	SEAL 70X55X15 VITON	2				
48	4022200309	O-RING 4875 VITON	2				
49	4022300001	FILTER IN NYLON D.6	1				
50	4023100047	BEARING 6309/C3	2				
51	4023130035	BUSHING 55X45X22	2				
52	4024251000	2-WAY RH OIL PUMP	1				
	4024251500	2-WAY LH OIL PUMP	1				

RV 520



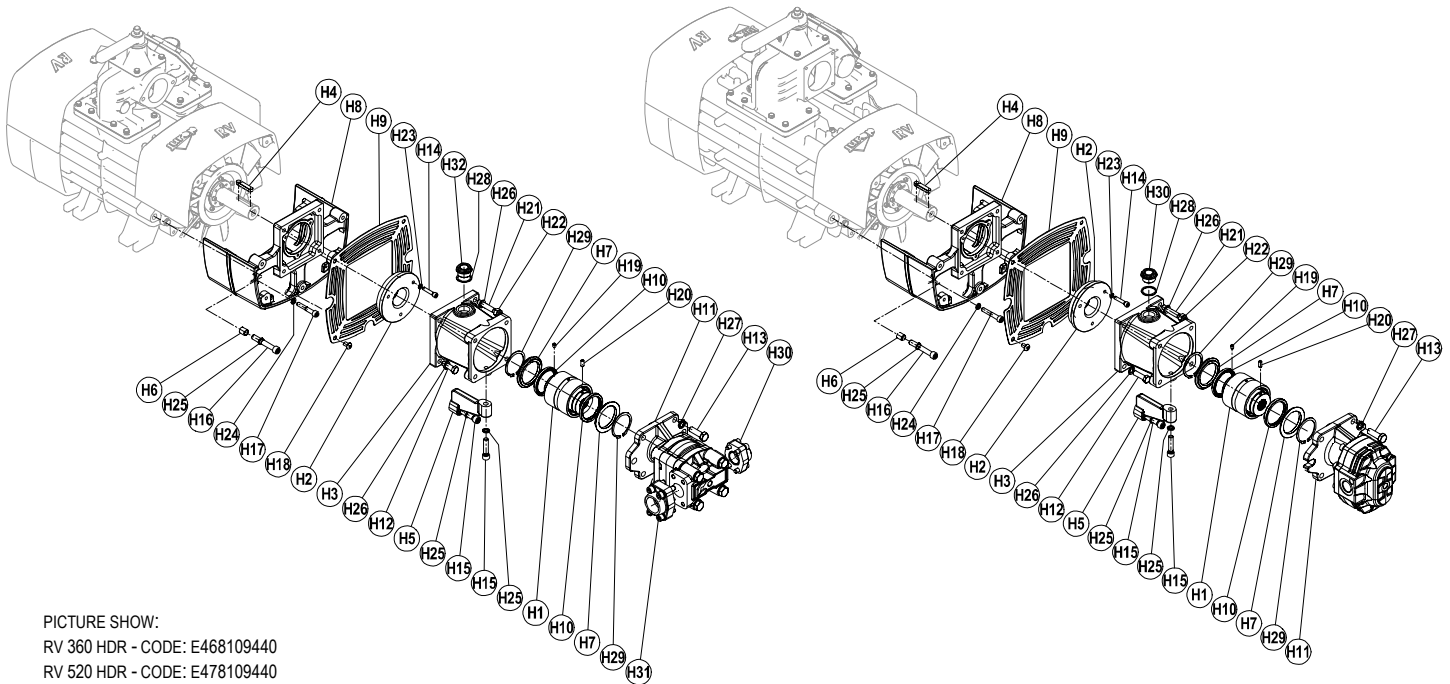
PICTURE SHOWS:
RV 520 CW ROTATION - CODE: A470809440
RV 520 CCW ROTATION - CODE: A470909440 (Box)

RV 520: A47...

RV 520

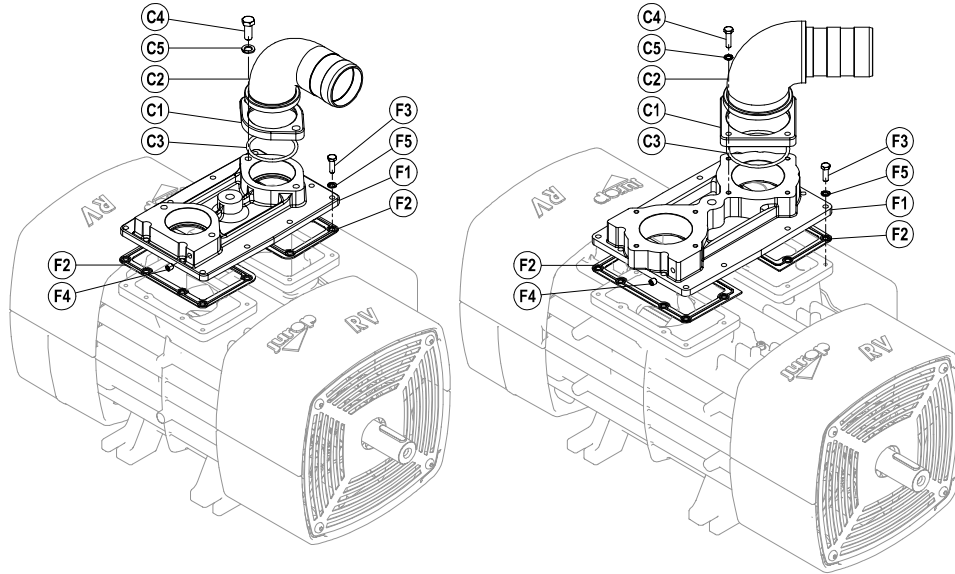
Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1601606900	RV 520 VANE	5	53	4025428111	SHRINK-DISK RCK16 40X65	2
2	1605500100	HANDLE	1	54	4026101301	SCREW TE 8,8 M 6X10 ZINC.	2
3	1608502500	INSIDE VALVE	1	55	4026102806	SCREW TE 8,8 M 8X20 ZINC.	4
4	1610508200	FLANGE	2	56	4026102807	SCREW TE 8,8 M 8X25 ZINC.	22
5	1610513900	FLANGE	2	57	4026102908	SCREW TE 8,8 M 10X30 ZINC.	12
6	16105CF2B0	OIL PUMP FLANGE	1	58	4026121305	SCREW TCEI 8,8 M 6X16 ZINC.	2
7	1611001400	FAN HUB	2	59	4026121307	SCREW TCEI 8,8 M 6X20 ZINC.	10
8	1621507900	RV 520 ROTOR	1	60	4026121401	SCREW TCEI 8,8 M 8X12 ZINC.	2
9	1622002600	OIL PUMP DRIVE	1	61	4026121405	SCREW TCEI 8,8 M 8X20 ZINC.	3
9 A	4026414617	PIN 3X40 (FOR RV 520 CCW)	1	62	4026121710	SCREW TCEI 8,8 M 12X35 ZINC.	2
10	1622010200	CONVEYOR DOWEL PIN	2	63	4026121719	SCREW TCEI 8,8 M12X80 ZINC.	4
11	1623100500	INSIDE VALVE COVER	1	64	4026121815	SCREW TCEI 8,8 M 10X60 ZINC.	6
12	1624042100	SHAFT SPACER	2	65	4026122005	SCREW TBEI 10,9 M 10X15 ZINC.	8
13	1624042800	SIDE OIL TANK SPACER	2	66	4026135415	GRUB SCREW 12,9 M 8X50	1
14	162409YKB0	SPRING SPACER	1	67	4026135504	GRUB SCREW 12,9 M 10X10	1
15	1624202300	INSIDE VALVE SPACER	1	68	4026171211	STUD SCREW. 8,8 M 12X80 ZINC	2
16	1626001100	SEAL BUSHING	2	69	4026300025	COMPENSATION RING LMKAS100C	2
17	1627105100	CONVEYOR	3	70	4026305508	SELF-LOCKING NUT M12.	2
18	1627105200	CONVEYOR WITH SUPPORT	1	71	4026308005	NUT M8 GALV.	2
19	16275007E0	MANIFOLD	1	72	4026350503	WASHER GROWER 6 ZINC.	12
20	16401008E0	CLAPET COVER	1	73	4026350505	WASHER GROWER 8 ZINC.	3
21	1642008300	CONVEYOR PROTECTION	1	74	4026350506	WASHER GROWER 10 ZINC.	6
22	1642008400	CONVEYOR WITH SUPPORT PROTECTION	1	75	4026350508	WASHER GROWER 12 ZINC.	6
23	1642100200	REAR OIL PUMP PROTECTION	1	76	4026350706	WASHER GROWER 8 ZINC. PIATTA	26
24	1650022100	RV REAR SHAFT	1	77	4026351506	WASHER M10 ZINC.	12
25	1650022200	RV FRONT SHAFT	1	78	4026357003	FLAT WASHER M6 ZINC.	2
26	16630050E0	PIPE TANK RV520 RH	1	79	4026357007	FLAT WASHER M12 ZINC.	2
	16630051E0	PIPE TANK RV520 LH	1	80	4026426703	RUBBER BAND D.6,5	2
27	1663069900	OIL PUMP – REAR FLANGE OIL LINE	1	81	4026501006	TAB 12X8X56	1
28	1663064500	OIL PUMP – ANTERIOR FLANGE RV520 RH	1	82	4026702000	CONNECTION UN.DIR. 4X1/8	4
	1663065100	OIL PUMP – ANTERIOR FLANGE RV520 LH	1	83	4026706000	CONNECTION UNIV.90°4X1/8	2
29	1663064700	REAR RH/ANTERIOR LH HOUSING OIL LINE	1	84	4026706003	CONNECTION 90° 6X1/8	2
	1663064900	ANTERIOR RH/REAR LH HOUSING OIL LINE	1	85	4026706101	ADJUSTABLE CONNECTION 4-1/8	2
30	1663064900	ANTERIOR RH/REAR LH HOUSING OIL LINE	1	86	4026904503	PLUG M20X1,5	1
	1663064700	REAR RH/ANTERIOR LH HOUSING OIL LINE	1	87	4026910103	PLUG G1	1
31	1672001600	SPECIAL SCREW TCEI M10X1,5	10	88	4028360000	FRONT FAN (FOR RV520 RIGHT VERSION)	1
32	1673001000	OIL FILTER PLUG	1		4028360001	FRONT FAN (FOR RV520 LEFT VERSION)	1
33	1680610200	MANIFOLD GASKET	2	89	4028360001	REAR FAN (FOR RV520 RIGHT VERSION)	1
34	16807011E0	CLAPET COVER GASKET	1		4028360000	REAR FAN (FOR RV520 LEFT VERSION)	1
35	1680707300	FRONT FLANGE GASKET	2	90	4029602701	NUT M8 PROTECTION	1
36	1680707800	INSIDE VALVE COVER GASKET	1				
37	1685002800	WASHER FE 30X8,5 SP.4 ZINC.	1		1892006000	KIT GASKET RV 520	1
38	1685100300	WASHER D20 ALU	2		1892006400	KIT SHAFT ANTERIEUR RV 360-520	1
39	1685100800	WASHER 8X14X1,5	2		1892006500	KIT REAR SHAFT RV 360-520	1
40	1687509400	RV 520 HOUSING	1				
41	1687600000	SIDE OIL TANK	1				
42	1691000000	SPRING	1				
43	18930008E0	CLAPET	1				
44	4022200030	SEAL 41X27X10 GP NBR1	1				
45	4022200044	SEAL 65X45X8	2				
46	4022200113	SEAL 70X55X15 VITON	2				
47	4022200309	O-RING 4875 VITON	2				
48	4022300001	FILTER IN NYLON D.6	1				
49	4023100047	BEARING 6309/C3	1				
50	4023105008	BEARING 21309 E/C3	1				
51	4023130035	BUSHING 55X45X22	2				
52	4024251000	2-WAY RH OIL PUMP	1				
	4024251500	2-WAY LH OIL PUMP	1				

RV 360-520 HYD



PICTURE SHOW:
RV 360 HDR - CODE: E468109440
RV 520 HDR - CODE: E478109440

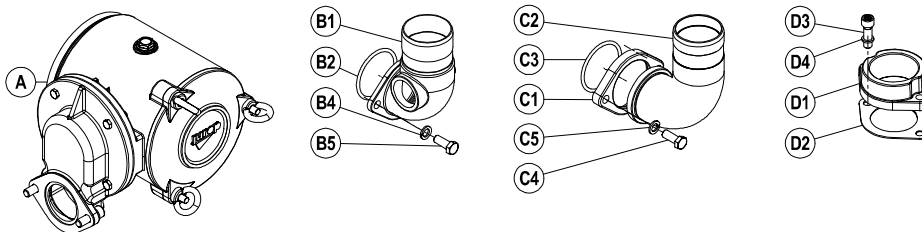
Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
RV 360 HYD				RV 520 HYD			
H1 *	1470106700	HDR RV COUPLING	1	H1 *	1470106700	HDR RV COUPLING	1
H2	1610052300	HDR RV FLANGE COUPLING	1	H2	1610052300	HDR RV FLANGE COUPLING	1
H3	1612501000	HDR MOTOR MOUNTING FLANGE	1	H3	1612501000	HDR MOTOR MOUNTING FLANGE	1
H4	1617015500	TAB RV360-520 HDR	1	H4	1617015500	TAB RV360-520 HDR	1
H5	16171001E0	SQUARE HDR	1	H5	16171001E0	SQUARE HDR	1
H6	1622010200	RV CONVEYOR DOWEL PIN	4	H6	1622010200	RV CONVEYOR DOWEL PIN	4
H7 *	1624042300	HDR RV COUPLING SEAL SPACER	2	H7 *	1624042300	HDR RV COUPLING SEAL SPACER	2
H8	1627105200	RV CONVEYOR WITH SUPPORT	2	H8	1627105200	RV CONVEYOR WITH SUPPORT	2
H9	1642008400	CONVEYOR WITH SUPPORT PROTECTION	2	H9	1642008400	CONVEYOR WITH SUPPORT PROTECTION	2
H10 *	4022200011	SEAL A 64X80X8 NBR	2	H10 *	4022200011	SEAL A 64X80X8 NBR	2
H11	4024107009	RV360 HYDRAULIC MOTOR	1	H11	4024107001	RV520 HYDRAULIC MOTOR	1
H12	4026103004	SCREW TE 8,8 M12X40 UNI5739 GALV.	4	H12	4026103004	SCREW TE 8,8 M12X40 GALV.	2
H13	4026103111	SCREW TE 8,8 M14X45 GALV.	4	H13	4026103111	SCREW TE 8,8 M14X45 GALV.	4
H14	4026121409	SCREW TCEI 8,8 M8X40 UNI5931 GALV.	3	H14	4026121409	SCREW TCEI 8,8 M8X40 GALV.	3
H15	4026121713	SCREW TCEI 8,8 M12X80 UNI5931 GALV.	2	H15	4026121713	SCREW TCEI 8,8 M12X50 GALV.	2
H16	4026121719	SCREW TCEI 8,8 M10X60 UNI5931 GALV.	4	H16	4026121719	SCREW TCEI 8,8 M12X80 GALV.	6
H17	4026121815	SCREW TBEI 10,9 M10X15 GALV.	8	H17	4026121815	SCREW TCEI 8,8 M10X60 GALV.	6
H18	4026122005	SCREW 12,9 M8X12	8	H18	4026122005	SCREW TBEI 10,9 M10X15 GALV.	8
H19 *	4026136005	SCREW 12,9 M8X20	1	H19 *	4026136005	SCREW 12,9 M8X12	1
H20 *	4026136009	SCREW TCEI 8,8 M8X40 UNI5931 GALV.	1	H20 *	4026136009	SCREW 12,9 M8X20	1
H21	4026171203	SCREW 8,8 M12X40 GALV.	2	H21	4026171203	SCREW 8,8 M12X40 GALV.	2
H22	4026305508	SELF-LOCKING NUT M12	4	H22	4026305508	SELF-LOCKING NUT M12	4
H23	4026350505	WASHER GROWER 8 GALV.	6	H23	4026350505	WASHER GROWER 8 GALV.	6
H24	4026350506	WASHER GROWER 10 GALV.	8	H24	4026350506	WASHER GROWER 10 GALV.	6
H25	4026350508	WASHER GROWER 12 GALV.	8	H25	4026350508	WASHER GROWER 12 GALV.	10
H26	4026350709	WASHER GROWER 12 FLAT SEC. GALV.	4	H26	4026350709	WASHER GROWER 12 GALV.	4
H27	4026350710	WASHER GROWER 14 FLAT SEC. GALV.	4	H27	4026350710	WASHER GROWER 14 GALV.	4
H28	4026359001	WASHER 40X33,5X1,5	1	H28	4026359001	WASHER 40X33,5X1,5	1
H29 *	4026510040	SEEGER E63 UNI7435-30	2	H29 *	4026510040	SEEGER E63 UNI7435-30	2
H30	4026711003	SAE G1"1/4 FLANGE	1	H30	4026904003	PLUG G1 GALV.	1
H31	4026711004	SAE G1"1/2 FLANGE	1				
H32	4026904003	PLUG G1 GALV.	1				
*	1892006300	COMPLETE JOINT KIT RV HDR		*	1892006300	COMPLETE JOINT KIT RV HDR	

RV 360-520 FL


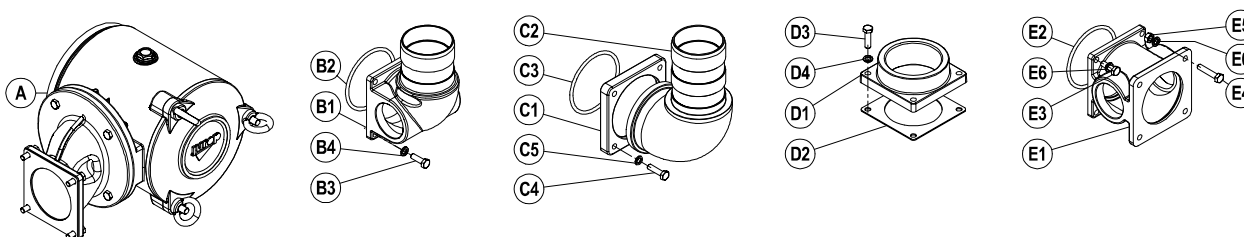
Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
RV 360 FL				RV 520 FL			
F1	1627505500	FLANGED MANIFOLD	1	F1	1627504800	FLANGED MANIFOLD	1
	1627505600	THREADED MANIFOLD (G2" ½)	1		1627504900	THREADED MANIFOLD (G4)	1
F2	1680611400	DISCHARGE SIDE MANIFOLD GASKET	1	F2	1680610200	MANIFOLD GASKET	2
	1680611500	SUCTION SIDE MANIFOLD GASKET	1	F3	4026102807	SCREW TE 8,8 M8X25 UNI5931 GALV.	12
F3	4026102807	SCREW TE 8,8 M8X25 UNI5931 GALV.	12	F4	4026135504	SCREW 12,9 M10X10 GALV.	1
F4	4026135504	SCREW 12,9 M10X10 GALV.	1	F5	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	12
F5	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	12		1852103900	ADJUSTABLE CONVEYOR Ø80	
	1852109000	ADJUSTABLE CONVEYOR Ø76			1852104000	ADJUSTABLE CONVEYOR Ø100	
C1	1610100000	CONVEYOR FLANGE	1	C1	1610101100	CONVEYOR FLANGE	1
C2	1627100500	CONVEYOR Ø76	1	C2	1627102700	CONVEYOR Ø80	1
C3	4022200307	O-RING 6287	1		1627102400	CONVEYOR Ø100	1
C4	4026103002	SCREW TE M12X30 UNI5739 GALV.	2	C3	4022200310	O-RING 6362	1
C5	4026350709	WASHER GROWER 12 FLAT. SEC. GALV.	2	C4	4026102808	SCREW TE M8X30 UNI5739 GALV.	4
				C5	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4

RV ACCESSORIES

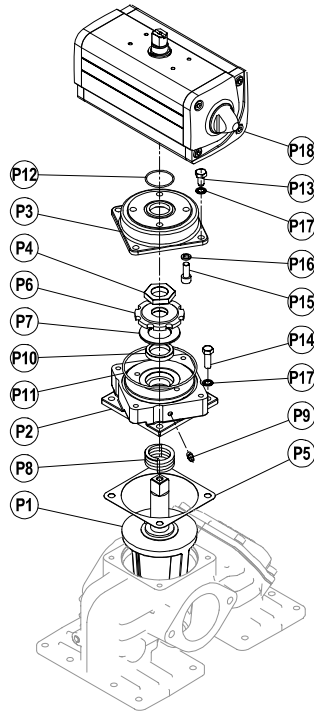
RV 360



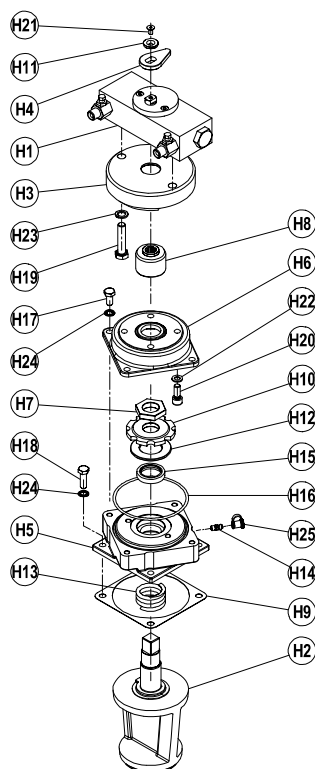
RV 520



Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
RV 360				RV 520			
A	18521CNGB0	SUCTION UNIT WITH FILTER		A	185212L4B0	SUCTION UNIT WITH FILTER	
	1852108900	FIXED SUCTION CONVEYOR Ø76			1852103400	FIXED SUCTION CONVEYOR Ø80	
	1852108600	FIXED SUCTION CONVEYOR Ø80			1852103500	FIXED SUCTION CONVEYOR Ø100	
B1	1627100200	SUCTION CONVEYOR Ø76	1	C1	1627101300	SUCTION CONVEYOR Ø80	1
	1627100300	SUCTION CONVEYOR Ø80	1		1627101200	SUCTION CONVEYOR Ø100	1
B2	4022200307	O-RING 6287 VITON	1	C2	4022200310	O-RING 6362	1
B3	4026103002	SCREW TE M12X30 ZINC.	2	C3	4026102807	SCREW TE M8X25 GALV.	4
B4	4026350709	WASHER GROWER 12	2	C4	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4
	1852109000	ADJUSTABLE CONVEYOR Ø76			1852103900	ADJUSTABLE CONVEYOR Ø80	
C1	1610100000	CONVEYOR FLANGE	1		1852104000	ADJUSTABLE CONVEYOR Ø100	
C2	1627100500	CONVEYOR Ø76	1	C1	1610101100	CONVEYOR FLANGE	1
C3	4022200307	O-RING 6287	1	C2	1627102700	CONVEYOR Ø80	1
C4	4026103002	SCREW TE M12X30 UNI5739 GALV.	2		1627102400	CONVEYOR Ø100	1
C5	4026350709	WASHER GROWER 12 FLAT. SEC. GALV.	2	C3	4022200310	O-RING 6362	1
	1852111600	FLANGE 2" ½ NPT KIT		C4	4026102808	SCREW TE M8X30 UNI5739 GALV.	4
D1	1610101400	FLANGE 2" ½ NPT	1	C5	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4
D2	1680614500	MANIFOLD GASKET	1		1852111700	FLANGE 3" NPT	
D3	4026121711	SCREW TCEI 8,8 M12X40 GALV.	2	D1	1610101500	FLANGE 3" NPT	1
D4	4026350508	WASHER GROWER 12 GALV.	2	D2	1680709900	MANIFOLD GASKET	1
				D3	4026102808	SCREW TCEI 8,8 M8X30 GALV.	4
				D4	4026350706	WASHER GROWER 8 GALV.	4
					1852104100	KIT FOR SAFETY VALVE	
				E1	1627102500	SAFETY VALVE G2 SUPPORT	1
				E2	4022200310	O-RING 6362	1
				E3	4026102807	SCREW TE 8,8 M8X25 UNI5739 GALV.	4
				E4	4026102810	SCREW TE 8,8 M8X40 UNI5739 GALV.	4
				E5	4026308005	NUT M8 UNI5588 GALV.	4
				E6	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	8



Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
RV 360				RV 520			
	143028B7B0	PNEUMATIC OPERATED 4-WAY KIT			143028GZB0	PNEUMATIC OPERATED 4-WAY KIT	
P1	160858KNB0	INSIDE VALVE	1	P1	160858KBB0	INSIDE VALVE	
P2	161258B4B0	SUPPORT FLANGE	1	P2	161258H0B0	SUPPORT FLANGE	1
P3	1640580QB0	COVER	1	P3	1640580QB0	COVER	1
P4	167007ZAB0	NUT	1	P4	167007ZAB0	NUT	1
P5	1680700200	GASKET	1	P5	1680707800	CONVEYOR-CAP GASKET	1
P6	168409PQB0	WASHER	1	P6	168409PQB0	WASHER	1
P7	168529TFB0	SPACER	1	P7	168529TFB0	SPACER	1
P8	1691000200	SPRING	1	P8	1691000200	SPRING	1
P9	4022100100	GREASER M6X1	1	P9	4022100100	GREASER M6X1	1
P10	4022200005	SEAL 37X27X7	1	P10	4022200005	SEAL 37X27X7	1
P11	4022200330	OR SEAL 3375	1	P11	4022200330	OR SEAL 3375	1
P12	4022200331	OR SEAL 2137	1	P12	4022200331	OR SEAL 2137	1
P13	4026102804	SCREW TE M8X16	4	P13	4026102804	SCREW TE M8X16	1
P14	4026102807	SCREW TE M8X25	4	P14	4026102807	SCREW TE M8X25 GALV.	4
P15	4026121405	SCREW TCEI M8X20	4	P15	4026121405	SCREW TCEI M8X20 GALV.	4
P16	4026350505	WASHER GROWER 8 GALV.	4	P16	4026350505	WASHER GROWER 8 GALV.	4
P17	4026351505	WASHER M8	8	P17	4026351505	WASHER M8 GALV.	4
P18	4027100405	PNEUMATIC ACTUATOR	1	P18	4027100405	PNEUMATIC ACTUATOR	8



Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
RV 360				RV 520			
	14302033E0	HYDRAULIC OPERATED 4-WAY KIT			14302032E0	HYDRAULIC OPERATED 4-WAY KIT	
H1	14302031E0	HYDRAULIC ACTUATOR	1	H1	14302031E0	HYDRAULIC ACTUATOR	1
H2	160858KNB0	INSIDE VALVE	1	H2	160858KBB0	INSIDE VALVE	1
H3	16100416E0	HYDRAULIC ACTUATOR FLANGE	1	H3	16100416E0	HYDRAULIC ACTUATOR FLANGE	1
H4	16120286K0	PLATE	1	H4	16120286K0	PLATE	1
H5	161258B4B0	SUPPORT FLANGE	1	H5	161258H0B0	SUPPORT FLANGE	1
H6	1640580QB0	COVER	1	H6	1640580QB0	COVER	1
H7	167007ZAB0	NUT	1	H7	167007ZAB0	NUT	1
H8	16732001E0	COUPLER	1	H8	16732001E0	COUPLER	1
H9	1680700200	CONVEYOR-CAP GASKET	1	H9	1680707800	CONVEYOR-CAP GASKET	1
H10	168409PQB0	RING NUT	1	H10	168409PQB0	RING NUT	1
H11	16850007E0	WASHER M5	1	H11	16850007E0	WASHER M5	1
H12	168529TFB0	SPACER	1	H12	168529TFB0	SPACER	1
H13	1691000200	SPRING	1	H13	1691000200	SPRING	1
H14	4022100100	GREASER M6X1	1	H14	4022100100	GREASER M6X1	1
H15	4022200005	Y-SEAL 37X27X7	1	H15	4022200005	Y-SEAL 37X27X7	1
H16	4022200330	O-RING 3375	1	H16	4022200330	O-RING 3375	1
H17	4026102804	SCREW TE M8X16 GALV.	4	H17	4026102804	SCREW TE M8X16 GALV.	4
H18	4026102807	SCREW TE M8X25 GALV.	4	H18	4026102807	SCREW TE M8X25 GALV.	4
H19	4026102911	SCREW TE M10X45 GALV.	2	H19	4026102911	SCREW TE M10X45 GALV.	2
H20	4026121405	SCREW TCEI M8X20 GALV.	4	H20	4026121405	SCREW TCEI M8X20 GALV.	4
H21	4026155002	SCREW INOX304 TSPEI M5X10	1	H21	4026155002	SCREW INOX304 TSPEI M5X10	1
H22	4026312B01	WASHER DA 8	4	H22	4026312B01	WASHER DA 8	4
H23	4026350708	WASHER M8 GALV.	2	H23	4026350708	WASHER GROWER 10 GALV.	2
H24	4026351505	SCREW TE M8X25 GALV.	8	H24	4026351505	WASHER M8 GALV.	8
H25	4029602700	PROTECTION CAP	1	H25	4029602700	PROTECTION CAP	1

10. Cooling fans installation instructions


Material

Code	Description
4025428111	4 SCREW LOCKING COLLAR
4028360000	CLOCKWISE ROTATION FAN
4028360001	COUNTER CLOCKWISE ROTATION FAN
1611001400	FAN HUB
4046850012	THREAD-LOCKER MEDIUM RESISTANCE LOCTITE 243 (*)

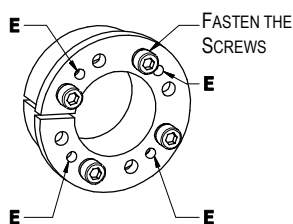
(*): 10 cc tube available upon request.

Before installation

- Clean all the components: remove dirt and particles that can prevent a correct assembly.
- Prepare the locking element:
 - Align bushing keys.
 - Apply medium resistance thread-locker on the locking screw threads. Pour on the thread evenly.
 - Fasten the 4 screws and leave them loose by at least 2 full turns.
- Do not use the threaded holes that can be seen on the locking collar front. These are used for the disassemble.



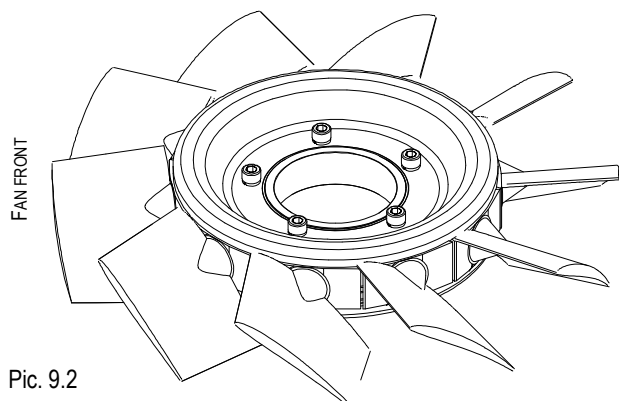
Do not use the threaded holes that can be seen on the locking collar front. These are used for the disassemble.



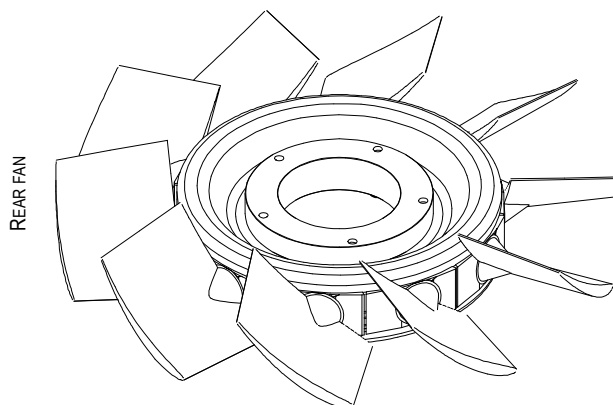
Pic. 9.1

E: Threaded holes for disassembly

- Install the steel hub and the fan by means of the 5 screws and washers.
- Apply medium resistance thread-locker on the locking screw threads. Pour on the thread evenly.
- Fasten the screws following a cross shake pattern.
- Check the screw fastening twice to be sure they have been evenly tightened.



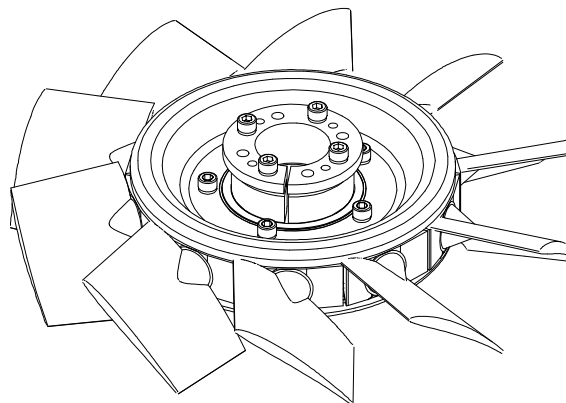
Pic. 9.2



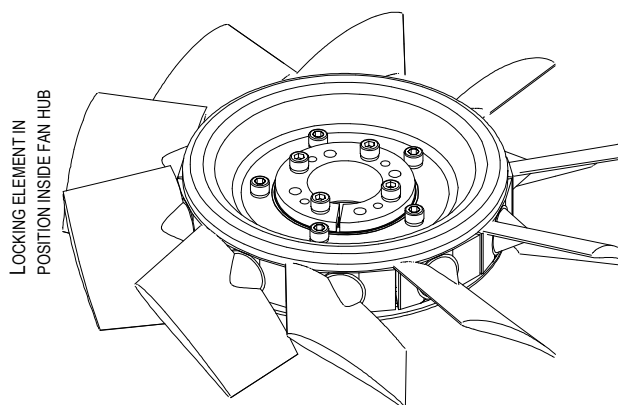
Pic. 9.3

Installation

- Insert the locking collar inside the fan hub as shown in pictures below, until in touch with the fan hub.




Pic. 9.4



Pic. 9.5

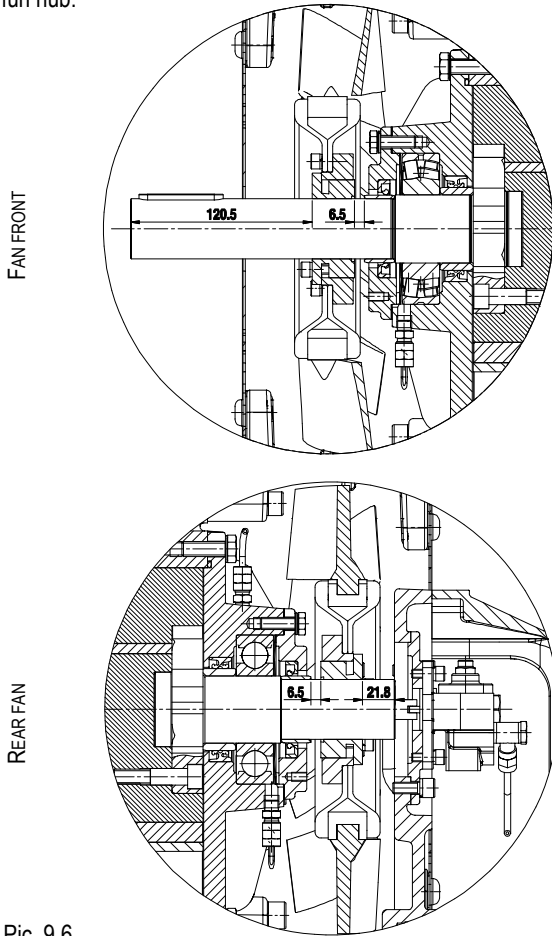
- Install pre assembled fan on the shaft.
- Be careful to respect the suggested distance of 9 mm in between the fan hub and the end of stroke on the shaft.



Respect the suggested distance of 9 mm in between the fan hub and the end of stroke on the shaft.

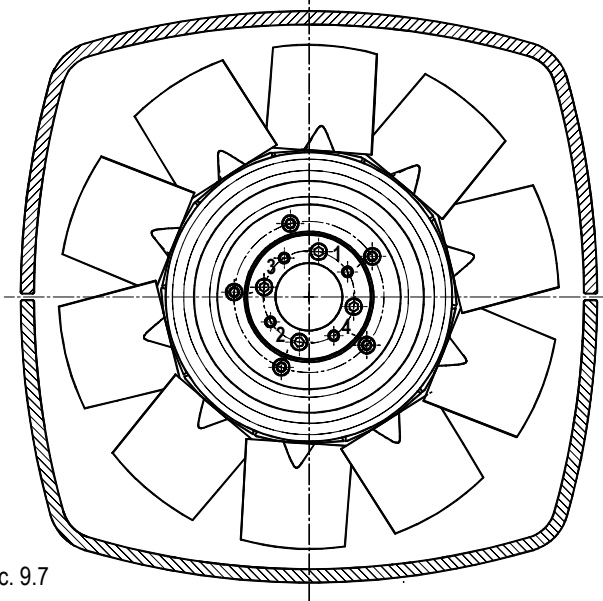
- Use a spacer to keep the suggested distance.

- Bring in position, and keep the locking element in touch with the fan hub.



Pic. 9.6

- Use just 4 screws with Torque=17Nm:
 - 1° time: Tighten the 4 screws on the locking collar (Torque=17Nm) Fasten them following a cross shaped pattern;
 - 2° time: Lower the torque to 16Nm and fasten the screws again, always following a cross-shaped pattern.
 - 3° time: If necessary, check one last time the screws (Torque=16Nm) to be sure that they have been tightened evenly.

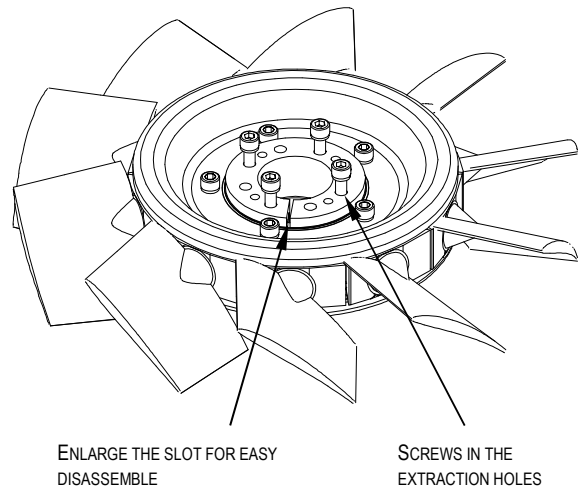


Pic. 9.7

Disassemble

- Remove the 4 screws that keep the locking collar in place (Pic. 9.8).
- If possible, use an impulse screwdriver.
- Heat the hub with if the screws are stuck because of dirt, rust or if thread locking glue has been used.
- Once the two parts of the locking collar separate, it's possible to remove the fan from the shaft.
- If needed, insert a flat head screwdriver in the crack, to help the removal.

Heat the hub with if the screws are stuck because of dirt, rust or if thread locking glue has been used.



Pic. 9.8

Model	Issue date	Revision No.	Revision date	Filled out by	Viewed by
RV 360 - 520	10-09-2013	11	20-10-2021	U.T.	A.T.

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