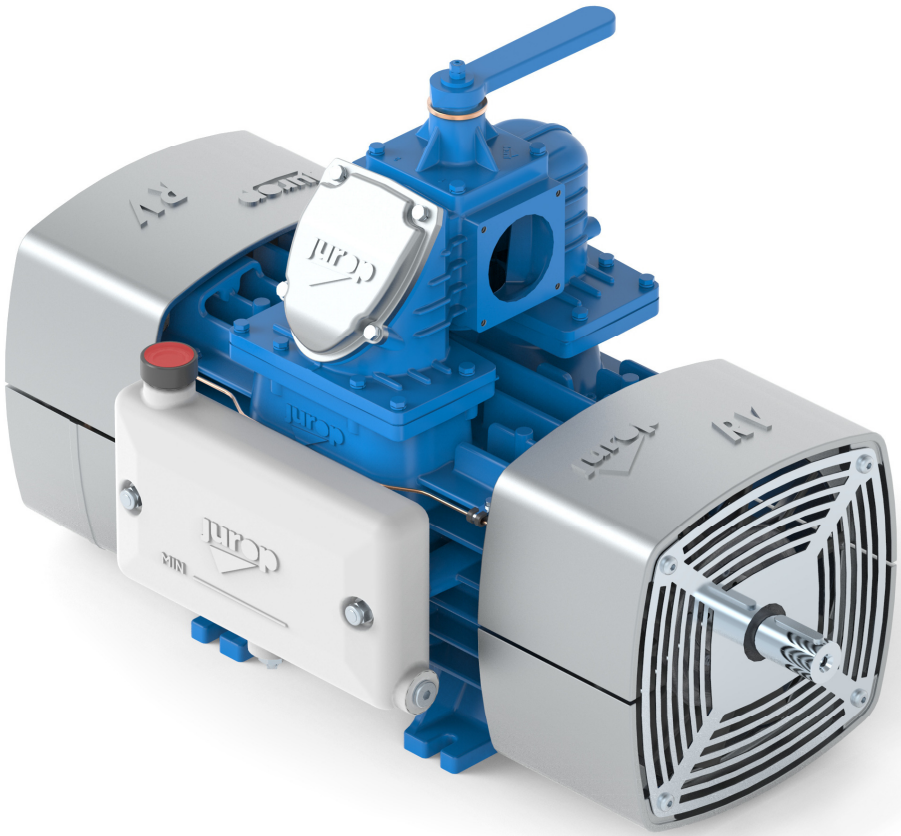
EN

RV360 - RV520

ORIGINAL INSTRUCTIONS



INSTALLATION, USE AND MAINTENANCE MANUAL

jurop

COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV GL = ISO 9001 =

Rev. 09
21-03-2016

Contents

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.

• 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):	K60001
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

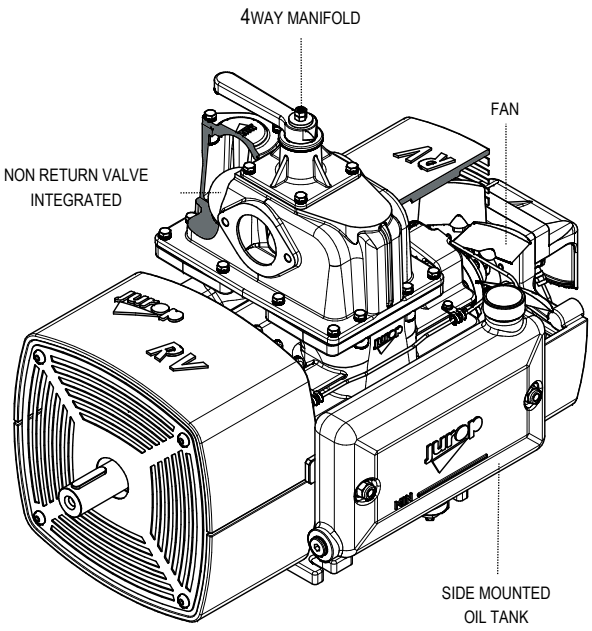
1.3 Warranty terms and conditions

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

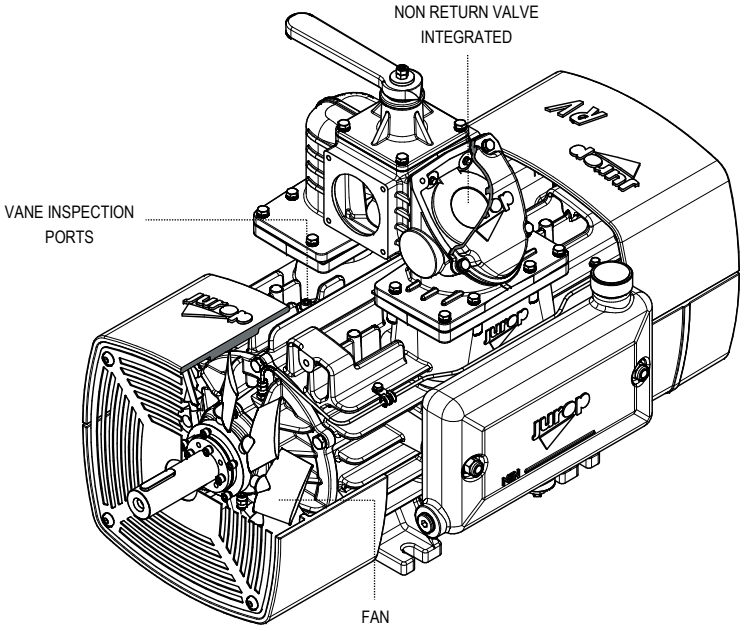
2. Technical data

- Rotary vacuum pump cooled by high efficiency **contrapposed fans**. The airflow reduces the temperature of the internal parts normally subjected to wear like bearings, vanes and sealings.
- High resistance tangential vanes. Suitable for heavy duty operation.
- Automatic lubrication with positive displacement pump. **Side mounted oil tank**. Copper oil piping.
- N°2 vane **inspection ports**.
- Built-in **4-way vacuum/pressure manifold**. Pneumatic actuator available on request.
- **Non-return valve** integrated in the pump manifold (RV360). Check valve installed on the pump inlet (RV520).
- Aluminum conveyors.
- Available in flanged version (FL).
- Drive system:
  - Direct with smooth shaft;
  - With hydraulic motor.

RV 360

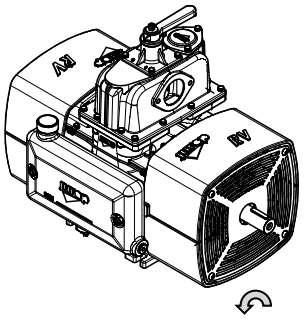


RV 520

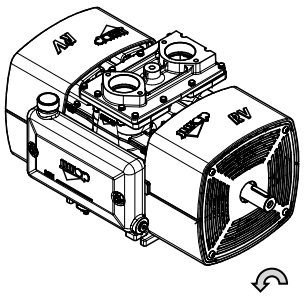


Weight	RV 360 manifold	RV 360 FL	RV 520 manifold	RV 520 FL
Direct with smooth shaft	175 kg	166 kg	220 kg	210 kg
With hydraulic motor	205 kg	196 kg	250 kg	240 kg

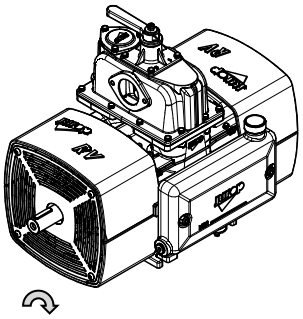
2.1 Dimensions and arrangement RV 360 – RV 520



ROTATION LEFT – WITH MANIFOLD



ROTATION LEFT – WITH FLANGE



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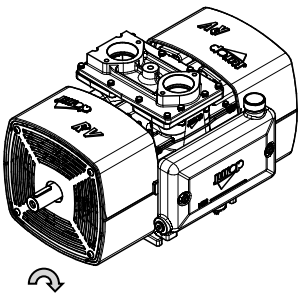
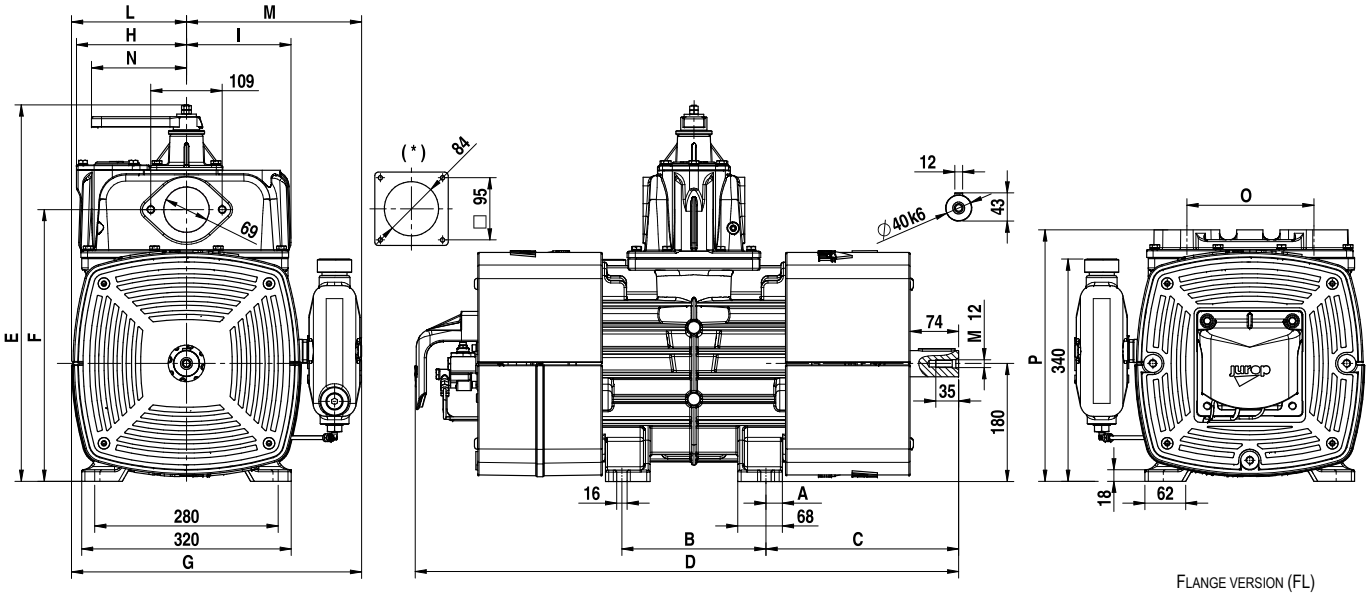


ROTATION RIGHT – WITH FLANGE

RV360 – RV520

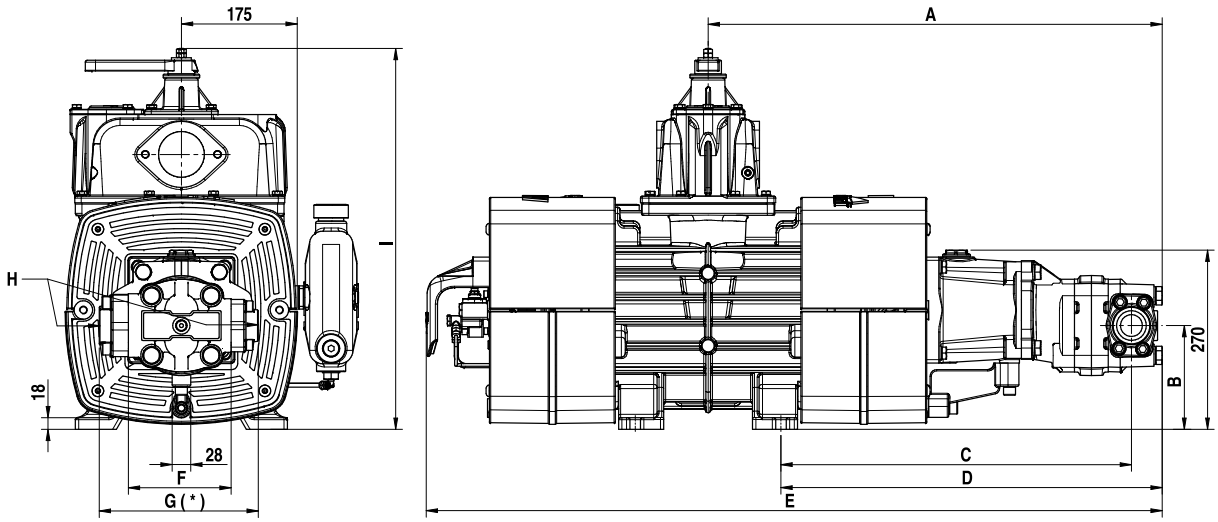


FLANGE VERSION (FL)

Dimensions (mm)	A	B	C	D	E	F	G	H	I	L	M	N	O	P
RV 360	25	220	294	830	577	415	443	168	160	175	267	145	192	384
RV 520	29,5	286	334	975	598	429	438,5	156,5	187,5	160	278,5	195	210	392

(*) : dimension of RV520 manifold

RV360 HDR – RV520 HDR

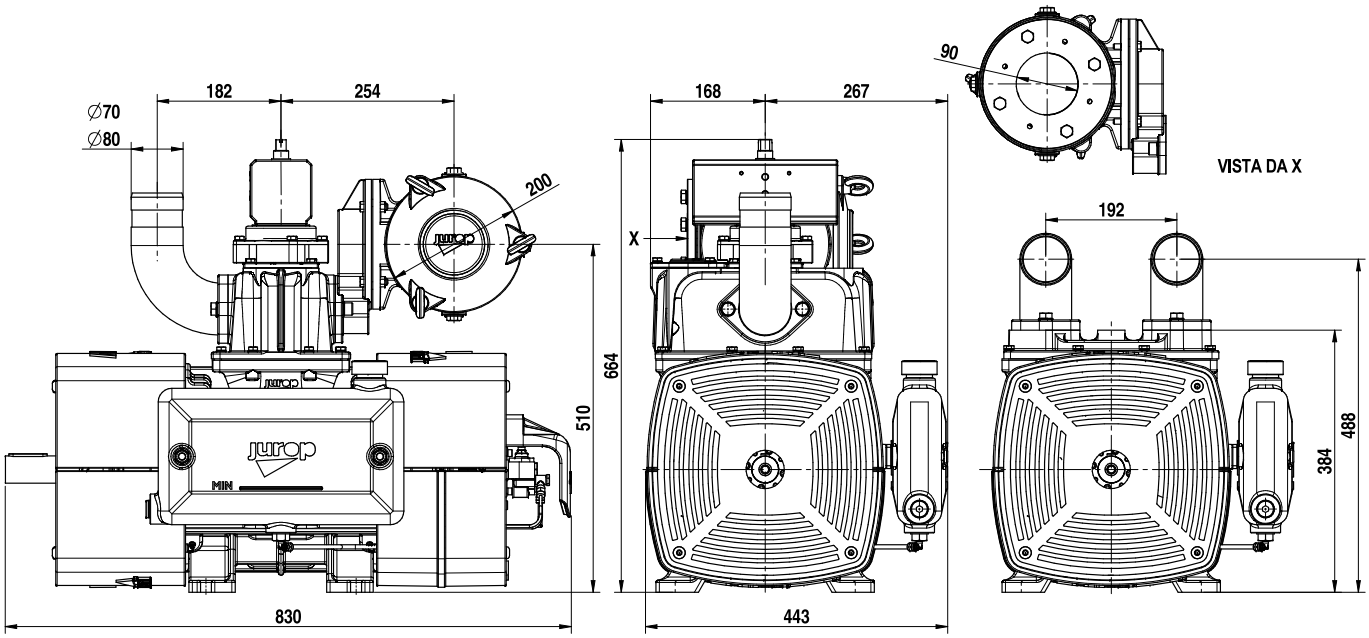


Dimensions (mm)	A	B	C	D	E	F	G (*)	H (IN)	H (OUT)	I
RV 360 HDR	686	157	529	576	1111	155	240	G1" ¼	G1" ½	577
RV 520 HDR	741	149	527	598	1239	150	-	G ¾	G1"	597,5

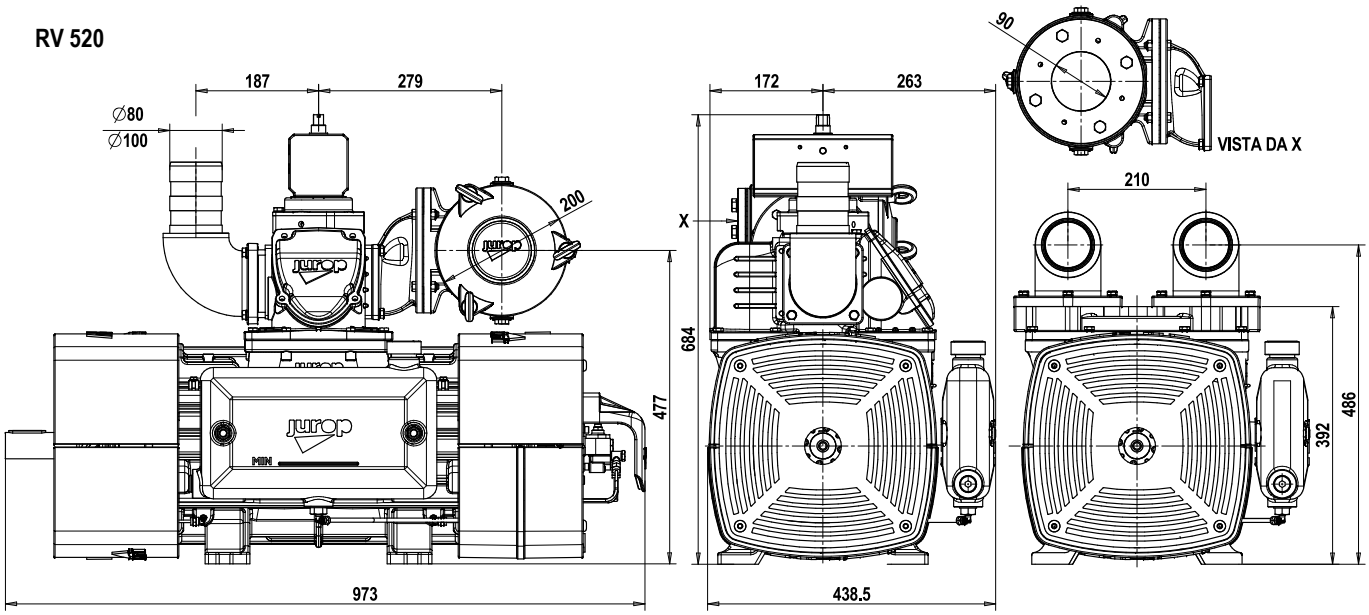
(*) : Dimension referred to RV360 hydraulic motor with flanges version.

2.2 Dimensions and arrangement - Accessories

RV 360



RV 520



2.3 Performances

Performances referred to vacuum pump operating at max. speed. Actual performance may vary of +/- 5%.

Performances	RV 360	RV 520
Air flow under free air condition	**10200 l/min** – 612 m³/h	**14700 l/min** - 882 m³/h
Air flow 60% vacuum rate	**9400 l/min** - 564 m³/h	**12915 l/min** - 775 m³/h
Max. vacuum at continuous duty	80%	80%
Max. vacuum	**95%**	**95%**
Power required at free port	14 kW	19 kW
Power required at max. vacuum	11 kW	16 kW
Airflow at 0.5 relative bar (1.5 abs.)	18 kW	24 kW
Airflow at 1.0 relative bar (2.0 abs.)	22 kW	30 kW
Max. relative pressure	1,0 bar (2,0 bar abs)	1,0 bar (2,0 bar abs)
Oil consumption	140 g/h	160 g/h
Oil tank capacity	4 l	4 l

REFERENCE CONDITIONS

Conveyed gas: air
Ambient reference temperature: 20°C
Vacuum condition: atmospheric discharge.
Vacuum functioning: free outlet
Absolute reference pressure: 1013mbar
Pressure condition: atmospheric suction.

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	m³/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	m³/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

Note: data at nominal speed.

Sound pressure level	RV 360	RV 520
Max. speed, 60% vacuum rate*	72 dB(A)	73 dB(A)

* : Noise of pump with exhaust silencer cod. 15470 D2C B0. Distance: 7m in open field.

2.4 Usage limitations

Model	Max. Speed – Operating speed (RPM)			P_2 (bar ABS)	T_2 (°C)	$T_2 - T_1$ (°C)	Environmental Temperature
	Minimum	Ordinary	Max				
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

P_1: absolute pressure during suction
P_2: absolute pressure during delivery
T_1: temperature during suction
T_2: temperature during delivery

2.5 Lubrication

Room. Temp.	Viscosity	Type	ENI	ESSO	SHELL	TOTAL	MOBIL	BP	TEXACO HAVOLINE
Under 10°C	ISO VG 46	Mineral oil	Acer 46	Nuto 46	Morlina oil 46	Drosera MS 46	Nuto H 46	Bartran HV 46	Rando HD 46
Over 10°C	ISO VG 150	Mineral oil	Acer 150	Nuto 150	Morlina oil 150	Drosera MS 150	Nuto H 150	Bartran HV 150	Rando HD 150

3. Safety and accident prevention

Attention:
Carefully apply these prescriptions.

3.1 General recommendations

• 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 equipments (gloves, protection glasses, boots...).

• To prevent errors and hazardous situations, establish what each operator is responsible for in the different maintenance operations.

• When transporting the pump, use proper slinging. Store the pump in stable places.

• Make sure that all the parts of the unit are idle and cool, before performing any maintenance operation.

• Before each maintenance operation, stop the pump and restore the atmospheric pressure.

• 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 injures. A filter must be mounted on the sunction line.

• Do not start the machine if the protection devices provided for transmissions are removed. Replace damaged parts.

• Pressure relief valve: point the air flux away from the operators.

• Do not use the aspirator over its designed limits: the machine may be damage and the operator may be injured.

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

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.

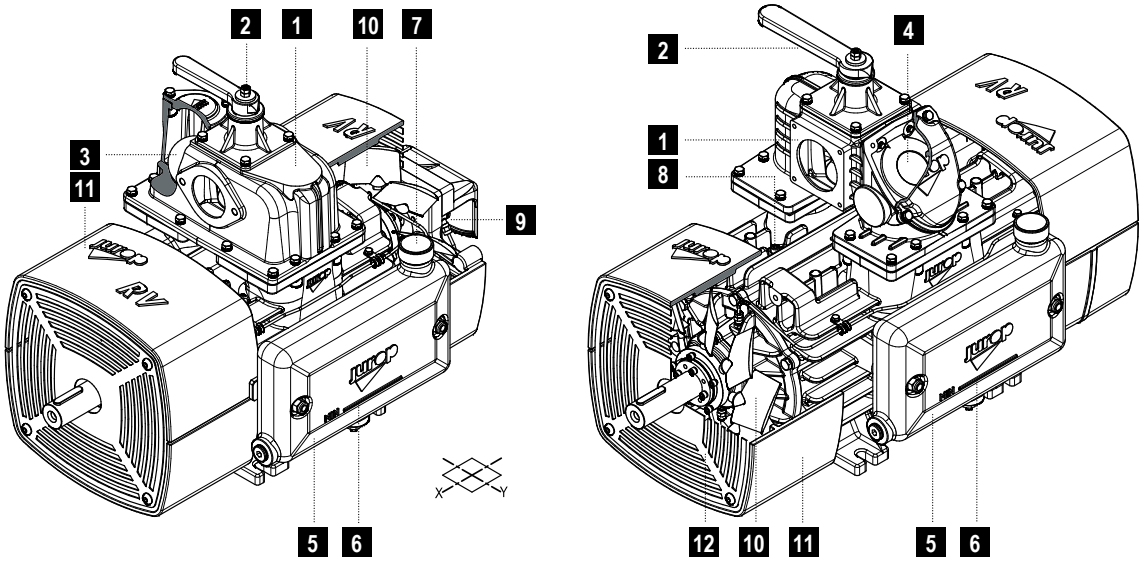
• Liquids or solids infiltrations can seriously damage the pump.

• Do not run the pump over its designed operating limits (see par. 2.4): it may break and transmission can be damaged.

4. Installation

Legend of main components

1. Manifold
2. Vacuum-pressure manifold
3. Non return valve (rubber ball RV 360)
4. Non return valve (clapet RV 360)
5. Oil Tank
6. Tank oil stand
7. Oil filler cap
8. Vane inspection ports
9. Lubrication pump
10. Cooling fan
11. Air cooling conveyors
12. Fan protection



Pic. 4.1

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.

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

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.

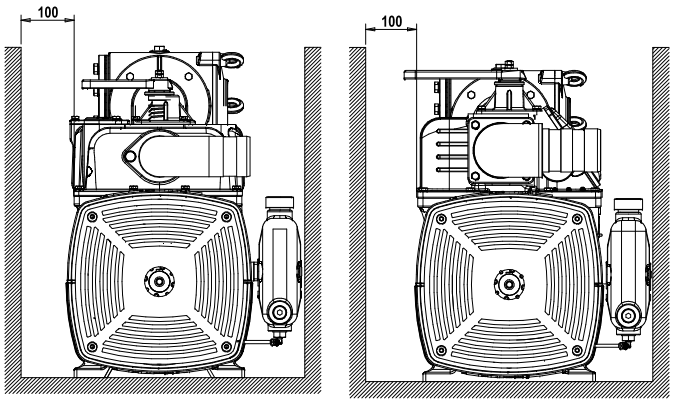
• To temporarily store a used pump, follow the instructions below:
- Thoroughly clean the pump.
- Equip the pump with suitable anti-corrosion protection.

4.3 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.

RV 360 RV 520

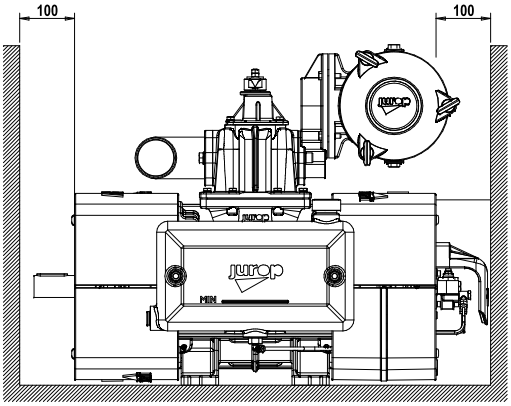


Pic. 4.2

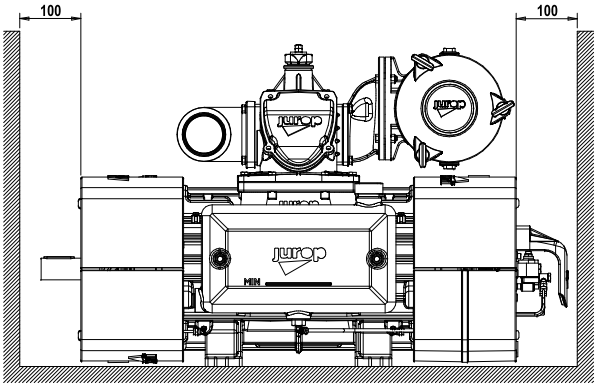
• Provide the necessary space to reach all points of lubrication control (oil level), and the oil tank filler cap, the lever of the 4-way switch, vanes inspection ports.

• 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.

RV 360

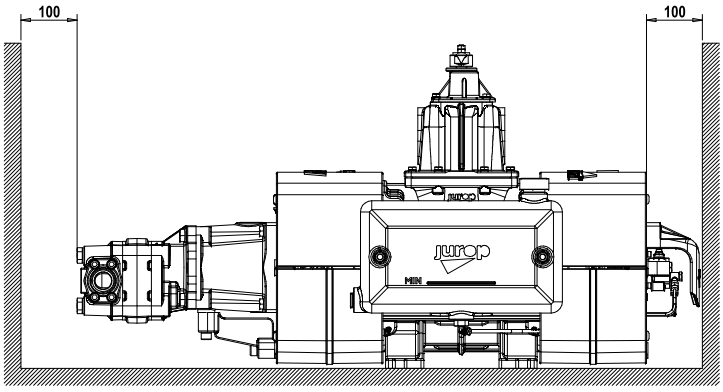


RV 520



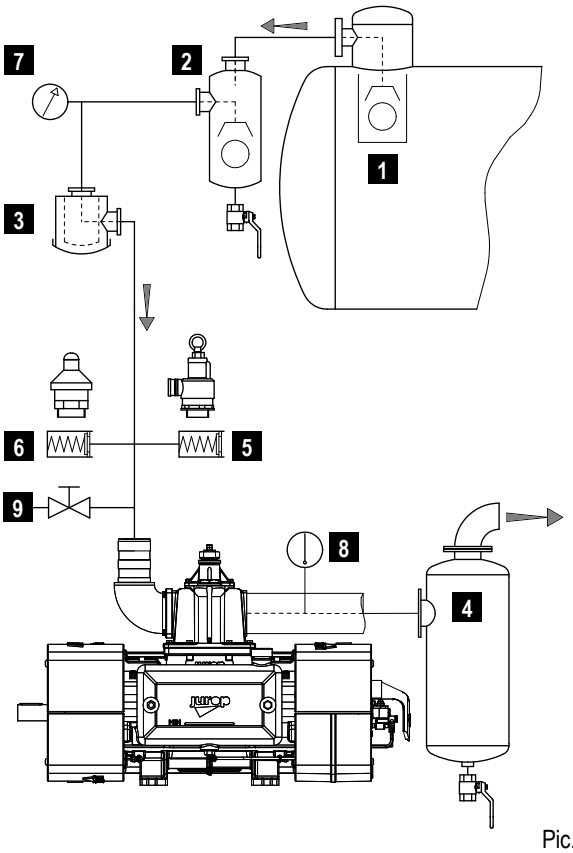
Pic. 4.3

• In case of RV with hydraulic motor, provide the necessary space to disassemble the motor itself and proceed with joint lubrication.



Pic. 4.4

4.4 Vacuum - pressure line



Pic. 4.5

Vacuum line components			
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		

• 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.

4.5 Hydraulic actuator adjustment

• Extraordinary maintenance operations can require the upper cover (and that of the actuator, either manual or pneumatic) to be removed. We recommend ensuring enough space to carry out such operations.

• If the cock blocks or it moves with friction, screw up the clearance regulation nut (A). Screw up ¼ of turn each time. Block the nut rotation with the safety nut.

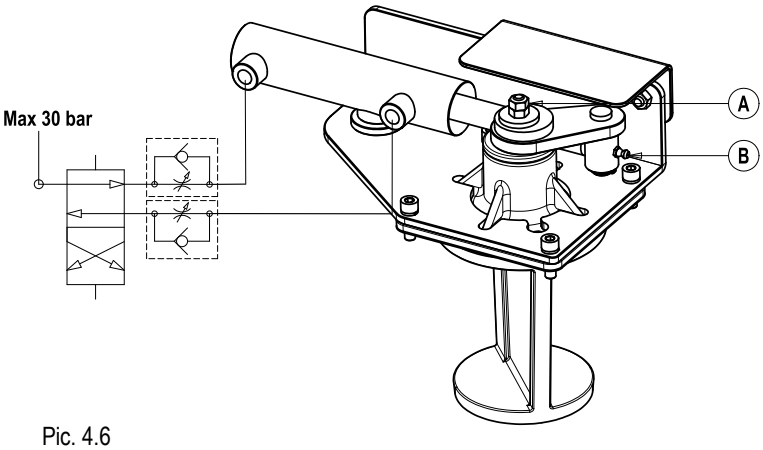
• The lubrication points (B) and the clearance regulation bolt (A) must be accessible. See Fig. 4.6.

• Lubricate with grease every 1000 cycles. Grease type NLGI 2.

• It is suggested to install 2 one-way flow controller between the hydraulic switch and the hydraulic actuator. Set the flow controllers in order to prevent hard hitting through the end of stroke. Minimum commutation time: 1 second.

• Maximum feed pressure: 30 bar.

• To order spare parts see spare parts list at the end of this manual.

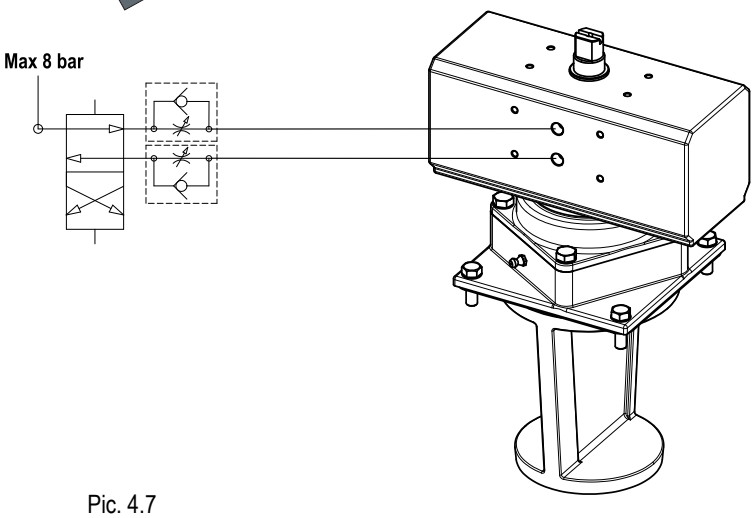


Pic. 4.6

4.6 Pneumatic actuator adjustment

• In the event of 4-way valves equipped with pneumatic actuator, we recommend installing two one-way flow regulators between the pneumatic “control” and the pneumatic actuator. The following figure shows a schematic view of a possible pneumatic installation.

• We recommend adjusting the two flow regulators in order for rotation to occur without knocks and with a switching time of at least one second.

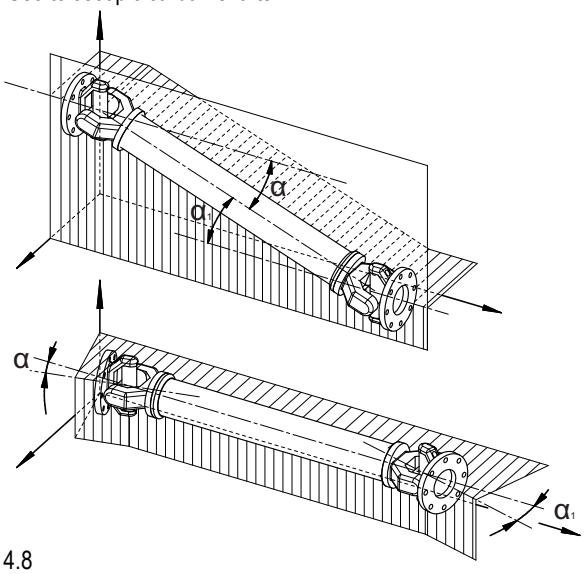


Pic. 4.7

4.7 Pump mounting - Drive connection

A) Cardan shaft drive

• Use telescopic cardan shafts.



Pic. 4.8

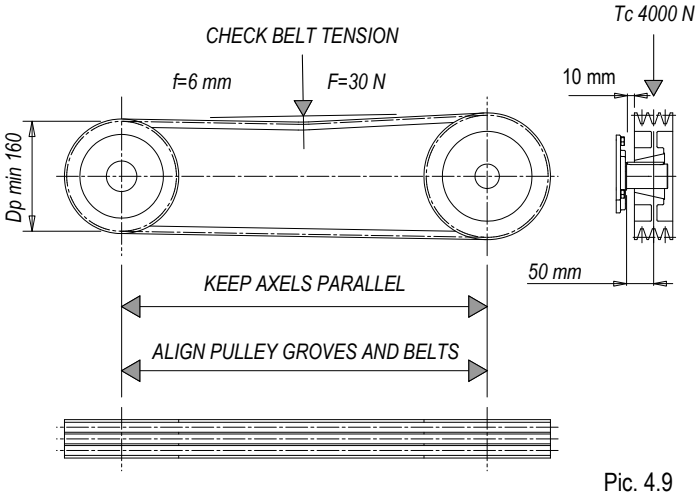
• In order to achieve a uniform motion of the driven shaft, the following requirements must be met (see Pic. 4.8):

- 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.

• 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.

B) Belt drive



Pic. 4.9

• 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 diven 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.

Model	Drive min. pulley p. diam.	T. max	Belts	Max. Speed	Max. Pressure	Max. Vacuum.
RV 360	160 mm	4000 N	XPB x 3	1300 rpm	2 bar abs	95%
RV 520	160 mm	4000 N	XPB x 4	1300 rpm	2 bar abs	95%

C) Hydraulic drive

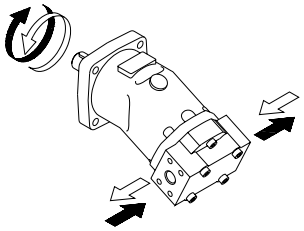
Modell		Displacement	Operating pressure	Flow	Max pressure draining line	Max. pressure motor exhaust	Max pressure
RV 360	Vac. Max.	61 cc/rev	130 bar	83 l/min (1300rpm)	5 bar	5 bar	180 bar
	0,5 bar rel	61 cc/rev	160 bar	83 l/min (1300rpm)	5 bar	5 bar	180 bar
RV 520	Vac. Max.	72 cc/rev	150 bar	99 l/min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



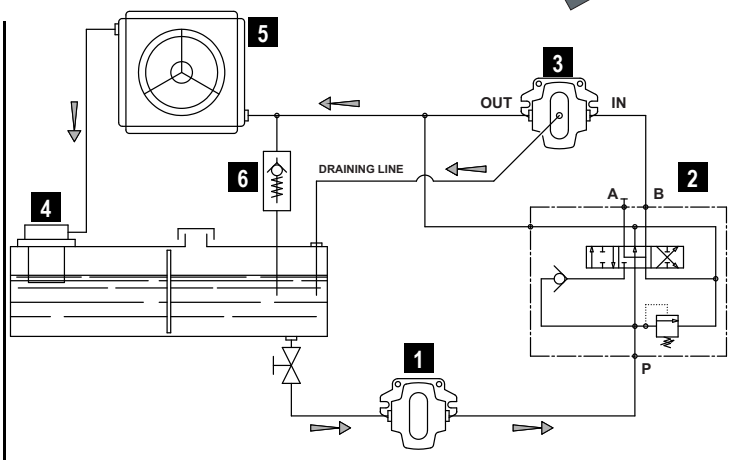
Pic. 4.10

• **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.



Pic. 4.11

1	HDR pump	4	Oil filter
2	Distributor	5 *	Heat exchanger
3	HDR 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.

5. Start up

5.1. Starting-up of the pump

Lubrication

• Check oil levels in rear mounted tank.

• In order to choose the most suitable oil, see paragraph 2.7.

Vacuum line

• Open all valves of the vacuum-pressure system.

• Open all gate valves and remove any possible obstacle from the line.

5.2. 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.

• If the pump has been in storage for a long time: inlet ½ liter of oil in the pump for an easy cleaning of internal parts.

• 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. 2.4).

• To reduce the vacuum rate to 80% max.

• Prepare adequately transmission.

5.3. Operating precautions

• Run the vacuum pump at a room temperature of -20°C e +40°C.

• Running at continuous duty: see paragraph 2.5.

• Do not make the vacuum pump overheat. Maximum air temperature on exhaust (or delivery) side: 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 2.6.

- 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 sack 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.

• Internal wash-up is necessary after prolonged inactivity, after working in dusty environments or in case of accidental suction of liquids.

Such operation must be carried out only on cooled pumps.

1. Disconnect the exhaust silencer, if possible;
2. Start running the pump at low speed (500 rpm circa) and low vacuum (20-30% max);
3. Suck some water (about 1-2 litres) through the inlet port;

Then suck oil (about 1 litre) to complete the wash-up and lubricate internal components.

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

• Once the needed vacuum rate has been reached, we recommend reducing the vacuum pump speed to its working speed (see par. 2.6): 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.

6. Maintenance

6.1 Ordinary maintenance

• 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	■			
		Clean fan protections	■			
		Check vanes wear			■	
		Pump's inner washing (*)				
	Overall	Greasing		■		
		Check cardan shaft drive				■
		Chack transmission pulley				■

(*) 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 5.3.

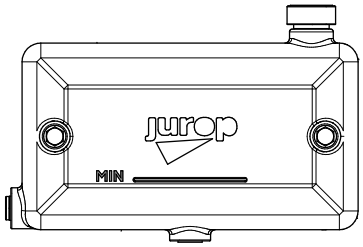
Checking lubrification

• 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 rear 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.



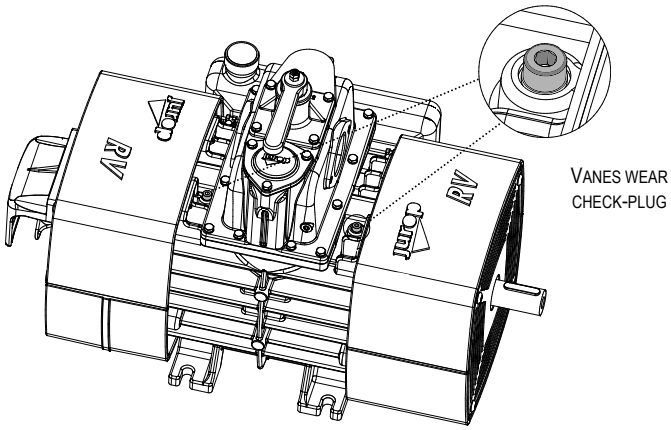
Pic. 6.1

• 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. See Fig. 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.



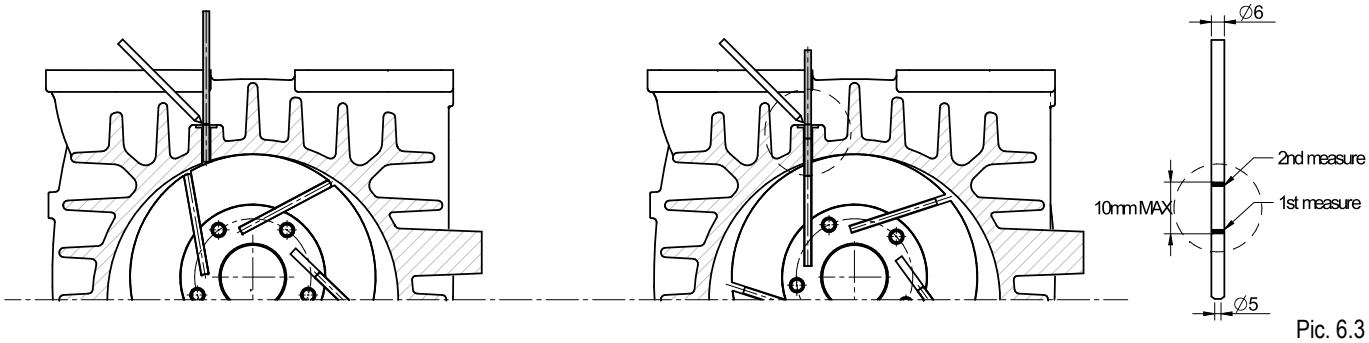
VANES WEAR CHECK-PLUG

Pic. 6.2

• 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.
• 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.



Pic. 6.3

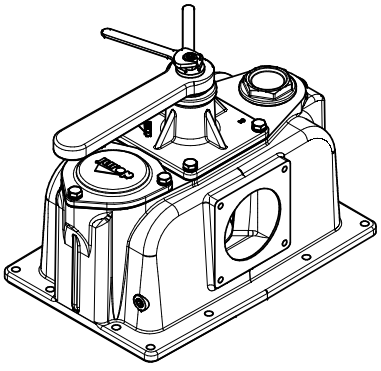
6.2. Extraordinary maintenance

• Before starting any extraordinary maintenance operation, be sure the pump stands still and follow the safety prescriptions as described in Cap. “Safety and accident prevention”.

Adjusting the 4-way valve

• 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).

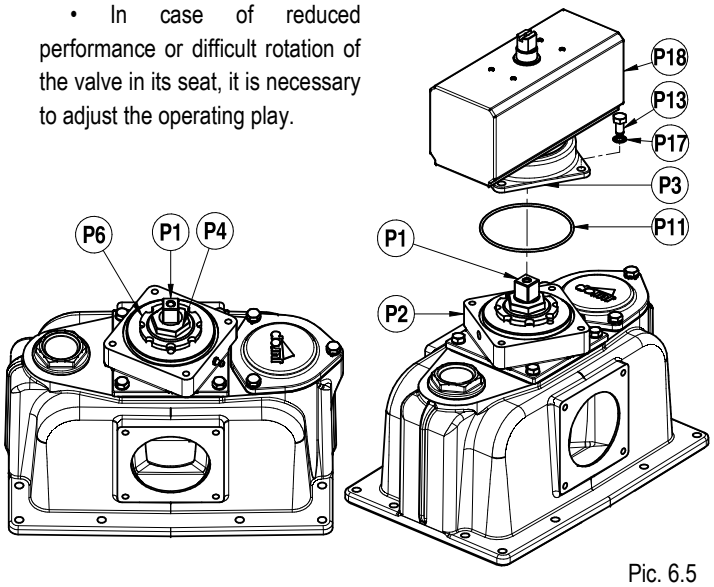
Attention: do not exceed with the adjustment: possible vacuum loss



Pic. 6.4

Adjusting the pneumatically operated 4-way valve

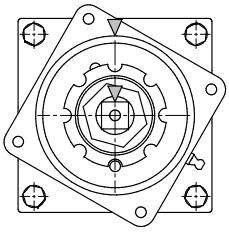
• In case of reduced performance or difficult rotation of the valve in its seat, it is necessary to adjust the operating play.



Pic. 6.5

• Unscrew the 4 screws M8x16 which fasten the top cover (P3) to the inferior support (P2).

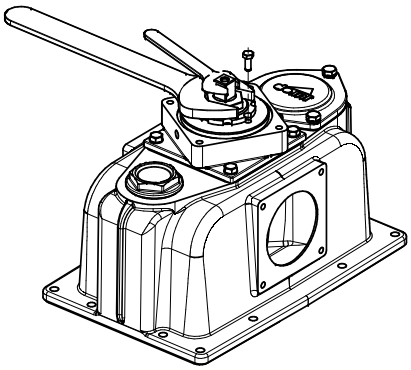
• Clean the inner part from the lubricant.



"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.

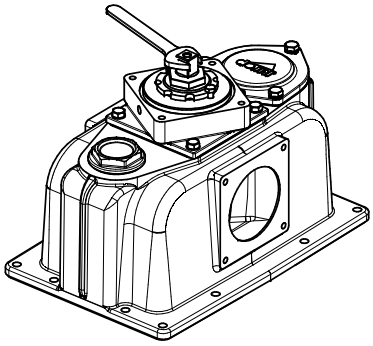
• Hold the valve in place with a 17 mm spanner and loosen the nut (P4) over the ferrule by ½ - ¾ turn with a 36 mm spanner.



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.

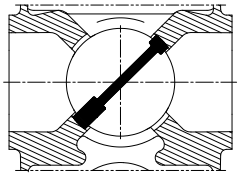


Pic. 6.7

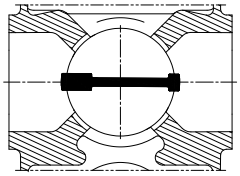
• Remove the screw which temporarily blocks the ferrule and check for the correct rotation of the valve by adjusting the shaft frame. Repeat the valve adjustment, if necessary.

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



INCORRETCT 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 (P11). Fasten the 4 screws.

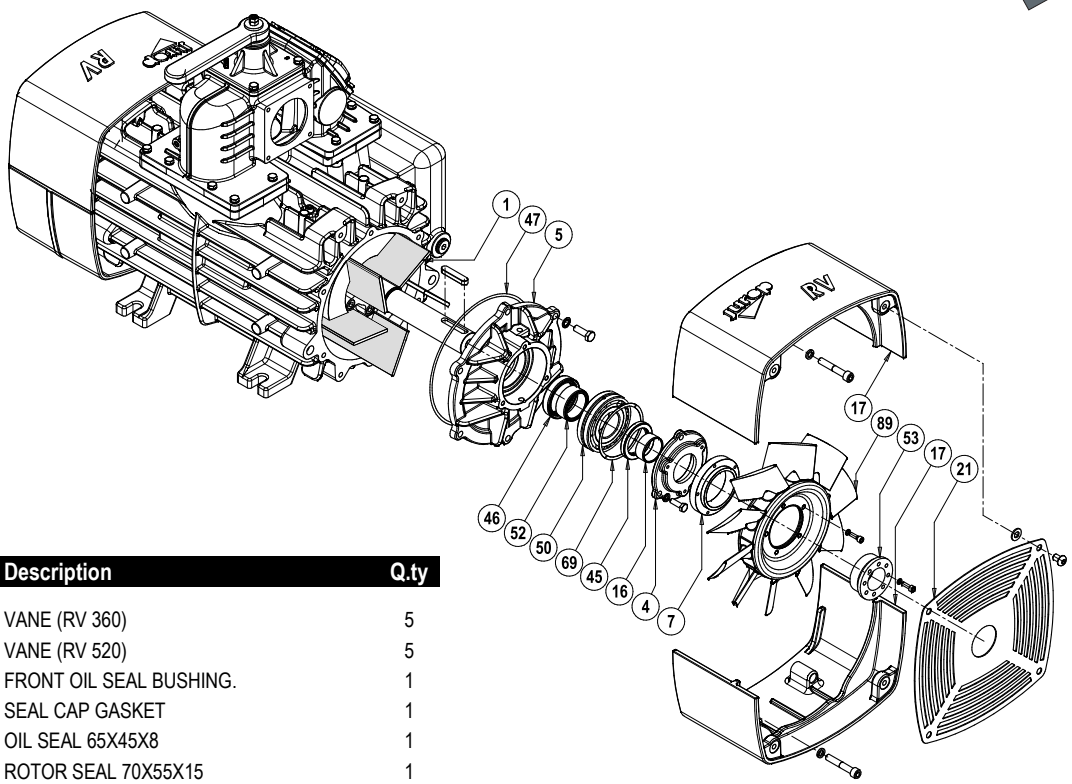
Replacing the vanes

• 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.



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

Pic. 6.8

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 fun (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.

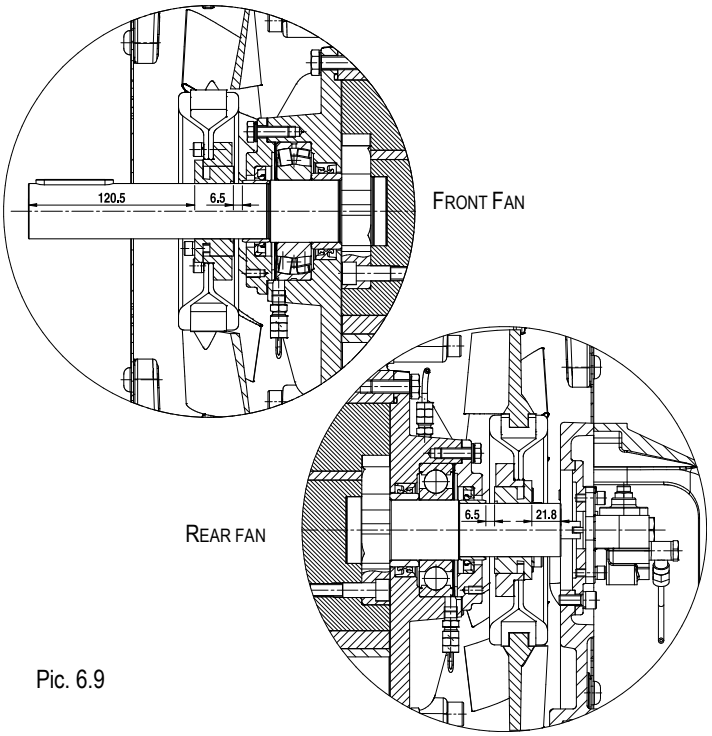
Reassembly

• 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.



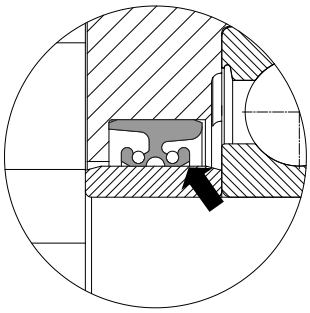
Pic. 6.9

• 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

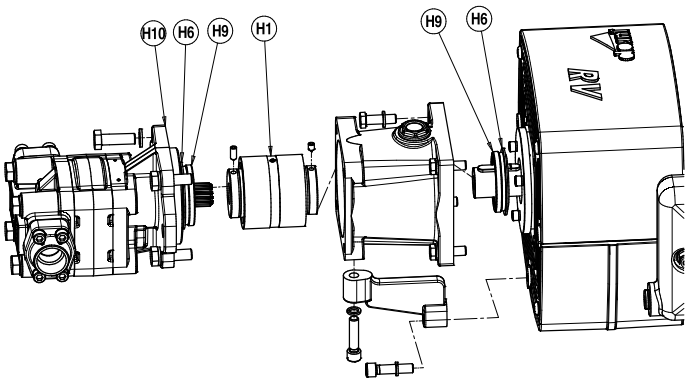
• We recommend the drive coupling be oiled when vanes are being replaced. See Pic. 6.11.

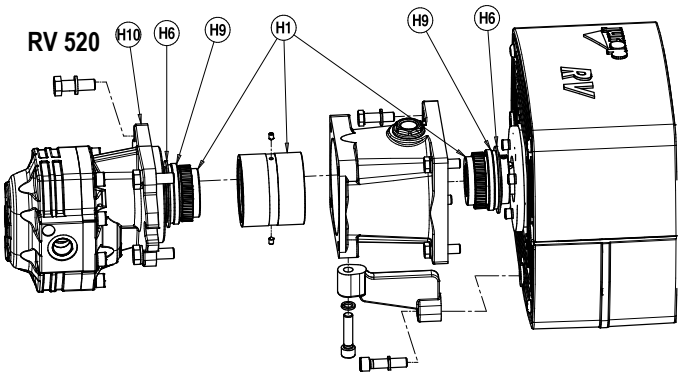
• However lubricate the drive coupling every 1500 hours.

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





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.

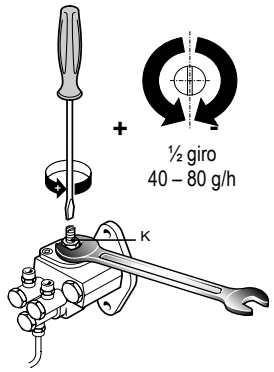
• Reassembly the motor without forcing onto the seals (H9).

Adjusting the self-lubricating pump

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

• 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.



Pic. 6.12

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

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

- Hydraulic oil.
- Rubber and plastic parts, such as hoses.
- Steel and aluminium parts.

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

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

RV 360

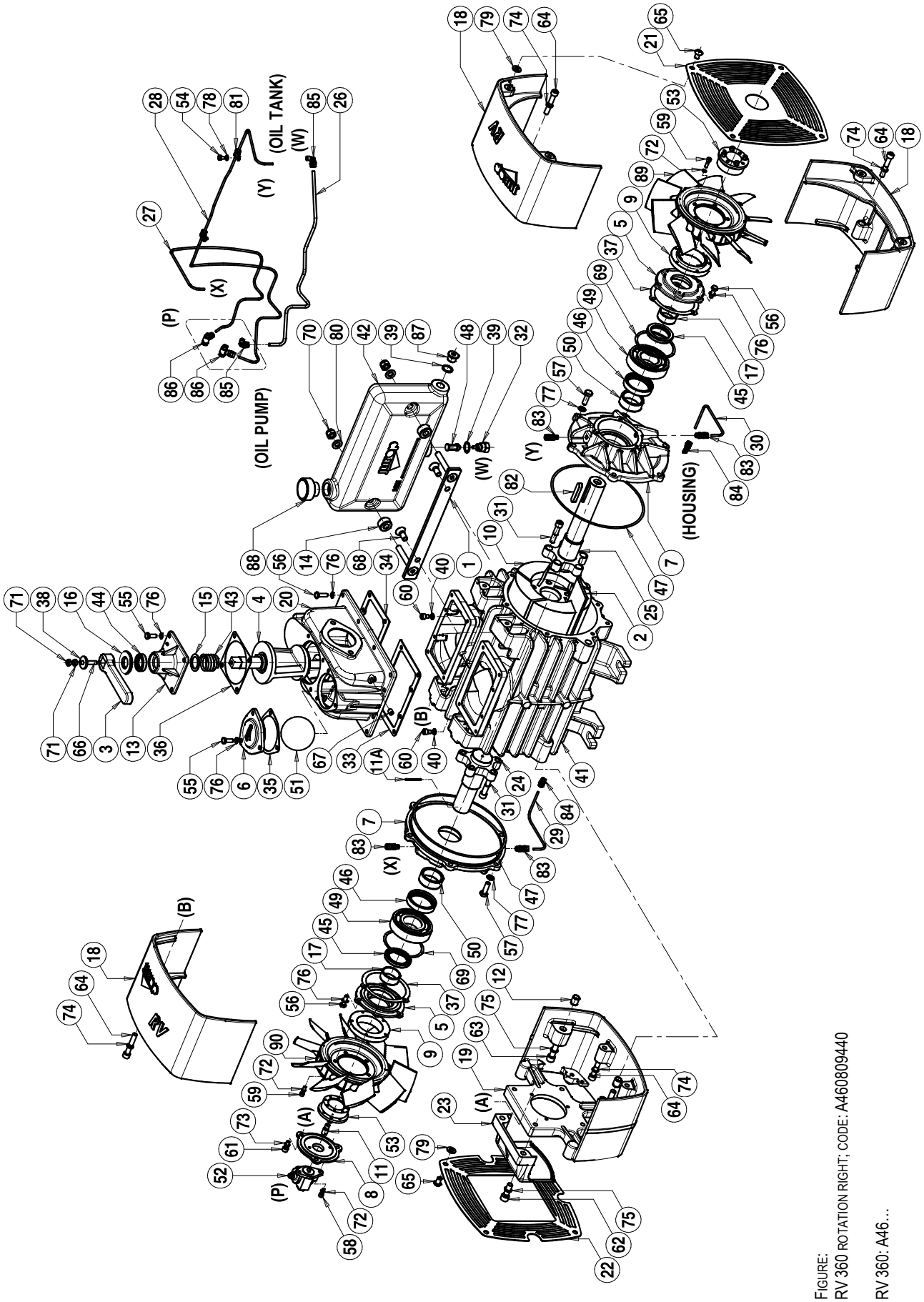


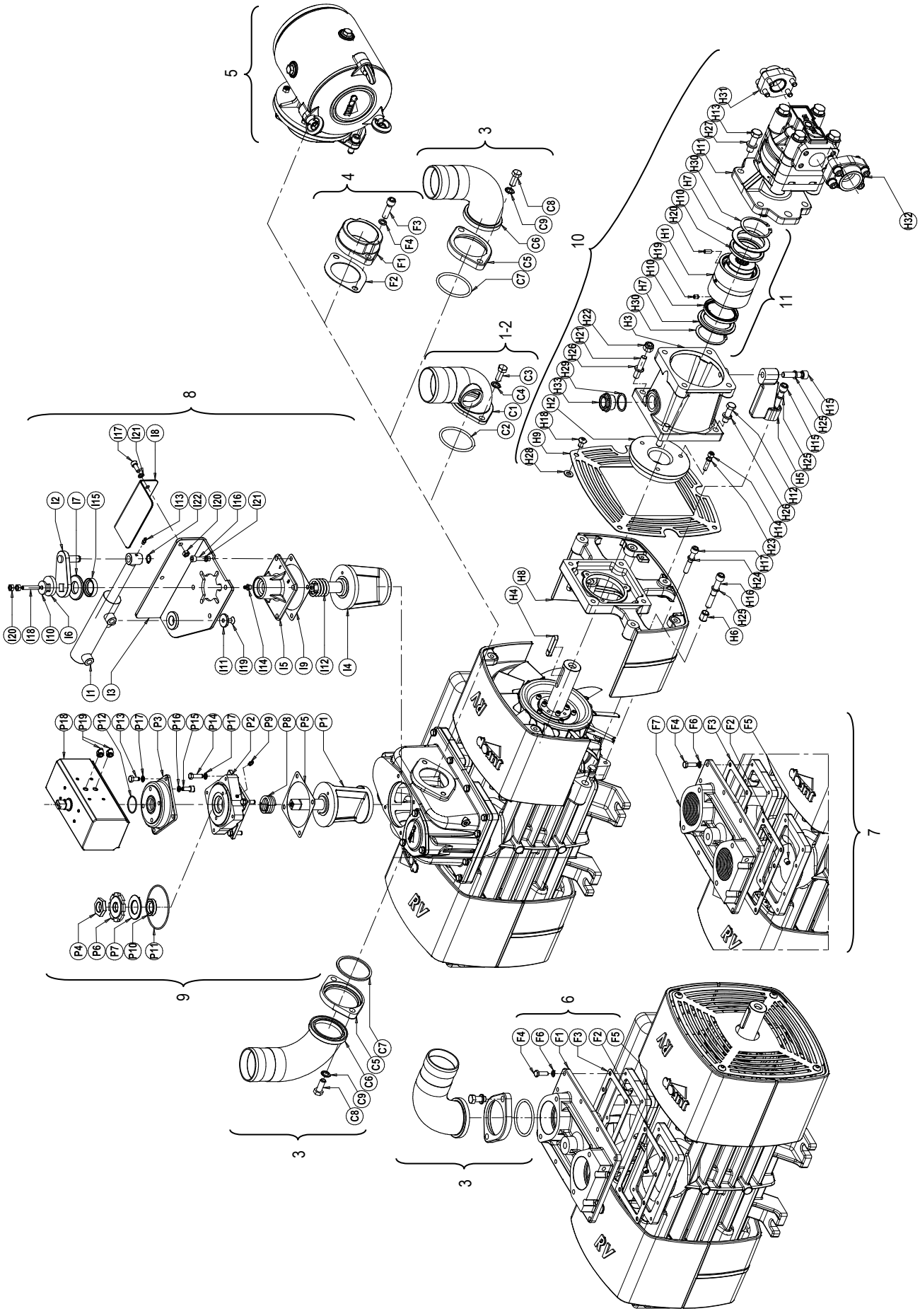
FIGURE:
RV 360 ROTATION RIGHT; CODE: A460809440

RV 360: A46...

RV 360

Pos.	Code	Description	Q.ty
1	1513053300	SIDE MOUNTED OIL TANK SUPPORT	1
2	1601605900	RV360 VANE	5
3	1605500000	COCK HANDLE	1
4	1608501700	COCK	1
5	1610508200	SEAL CAP	2
6	1610510800	4-WAY MANIFOLD CAP	1
7	1610513900	RV FLANGE	2
8	16105CF2B0	OIL PUMP FLANGE	1
9	1611001400	RV FAN HUB	2
10	1621503500	RV360 ROTOR	1
11	1622002600	OIL PUMP DRIVE	1
11A	4026414617	PLUG 3X40 (FOR RV360 LEFT VERSION)	1
12	1622010200	RV CONVEYOR DOWEL PIN	2
13	1623100000	COCK COVER	1
14	1624042800	SPACER	2
15	162409YKB0	SPACER	1
16	1624202300	COCK REGULATION SPACER	1
17	1626001100	SEAL BUSHING	2
18	1627105100	RV CONVEYOR	3
19	1627105200	RV CONVEYOR WITH SUPPORT	1
20	1627505300	MANIFOLD	1
21	1642008300	ANTERIOR RV CONVEYOR PROTECTION	1
22	1642008400	CONVEYOR WITH SUPPORT PROTECTION	1
23	1642100200	REAR OIL PUMP PROTECTION	1
24	1650022100	REAR RV SHAFT	1
25	1650022200	ANTERIOR RV SHAFT	1
26	16630040E0	PIPE TANK RV360 RH	1
	16630041E0	PIPE TANK RV360 LH	1
27	1663064300	OIL PUMP – REAR FLANGE OIL LINE RH	1
	1663069900	OIL PUMP – REAR FLANGE OIL LINE LH	1
28	1663064400	OIL PUMP – ANTERIOR FLANGE RV360 RH	1
	1663065000	OIL PUMP – ANTERIOR FLANGE RV360 LH	1
29	1663064600	REAR RH/ANTERIOR LH HOUSING OIL LINE	1
	1663064800	ANTERIOR RH/REAR LH HOUSING OIL LINE	1
30	1663064800	ANTERIOR RH/REAR LH HOUSING OIL LINE	1
	1663064600	REAR RH/ANTERIOR LH HOUSING OIL LINE	1
31	1672001600	SPECIAL SCREW TCEI M10X1,5	10
32	1673001000	OIL FILTER PLUG	1
33	1680611400	DISCHARGE SIDE MANIFOLD GASKET	1
34	1680611500	SUCTION SIDE MANIFOLD GASKET	1
35	1680611600	MANIFOLD CAP GASKET	1
36	1680700200	COCK COVER GASKET	1
37	1680707300	SEAL CAP GASKET	2
38	1685002800	WASHER 30X8,5X4 ZINC.	1
39	1685100300	WASHER D20	2
40	1685100800	WASHER 8X14X1,5 COPPER	2
41	1687509300	RV360 HOUSING	1
42	1687600000	OIL TANK	1
43	1691000000	COCK SPRING	1
44	4022200030	SEAL 41X27X10 GP NBR	1
45	4022200044	SEAL 65X45X8	2
46	4022200113	SEAL 70X55X15 VIT.	2
47	4022200309	OR 4875 VIT.	2
48	4022300001	NYLON D.6 OIL FILTER	1
49	4023100047	BEARING 6309/C3	2
50	4023130035	BUSHING 55X45X22	2
51	4023250501	RUBBER BALL D80 NBR	1
52	4024251000	2-WAY RH OIL PUMP	1
	4024251500	2-WAY LH OIL PUMP	1
53	4025428111	LOCKING SET RCK16 40X65	2
54	4026101301	SCREW TE 8,8 M8X20 GALV.	2
55	4026102806	SCREW TE 8,8 M8X25 GALV.	7
56	4026102807	SCREW TE 8,8 M10X30 GALV.	18
57	4026102908	SCREW TCEI 8,8 M6X16 GALV.	12
58	4026121305	SCREW TCEI 8,8 M6X20 GALV.	2
59	4026121307	SCREW TCEI 8,8 M8X12 GALV.	10
60	4026121401	SCREW TCEI 8,8 M8X20 GALV.	2
61	4026121405	SCREW TCEI 8,8 M12X35 GALV.	3
62	4026121710	SCREW TCEI 8,8 M12X80 GALV.	2
63	4026121719	SCREW TCEI 8,8 M10X60 GALV.	2
64	4026121815	SCREW TBEI 10,9 M10X15 GALV.	8
65	4026122005	SEAL 70X55X15 VIT.	8
66	4026135414	SCREW 12,9 M8X45 GALV.	1
67	4026135504	SCREW 12,9 M10X10 GALV.	1
68	4026155909	SCREW TSPEI 10,9 M12X30 GALV.	2
69	4026300025	COMPENSATION RING LMKAS100C	2
70	4026305508	SELF-LOCKING NUT M12	2
71	4026308005	NUT M8 GALV.	2
72	4026350503	WASHER GROWER 6 GALV.	12
73	4026350505	WASHER GROWER 8 GALV.	3
74	4026350506	WASHER GROWER 10 GALV.	8
75	4026350508	WASHER GROWER 12 GALV.	4
76	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	25
77	4026351506	WASHER M10 GALV.	12
78	4026357003	FLAT WASHER M10 UNI6592 GALV.	2
79	4026357006	FLAT WASHER M12 UNI6592 GALV.	8
80	4026357007	SCREW 12,9 M8X45 GALV.	2
81	4026426703	RUBBER BAND D.6,5	2
82	4026501006	TAB 12X8X56	1
83	4026702000	UNIV. DIR. CONNECTION 4XG1/8	4
84	4026706000	UNIV. 90° CONNECTION 4XG1/8	2
85	4026706003	UNIV. 90° CONNECTION 6XG1/8	2
86	4026706101	TURNING CONNECTION 4XG1/8	2
87	4026904503	PLUG M20X1,5	1
88	4026910103	PLUG G1	1
89	4028360000	FRONT FAN (FOR RV360 RIGHT VERSION)	1
	4028360001	FRONT FAN (FOR RV360 LEFT VERSION)	1
90	4028360001	REAR FAN (FOR RV360 RIGHT VERSION)	1
	4028360000	REAR FAN (FOR RV360 LEFT VERSION)	1
	1892005900	KIT GASKET RV360	1
	1892006400	KIT ANTERIOR SHAFT RV360-520	1
	1892006500	KIT REAR SHAFT RV360-520	1

RV 360 - ACCESSORIES



RV 360 Accessories

Pos.	Code	Description	Q.ty
1	**1852108600**	**FIXED SUCTION CONVEYOR Ø80 KIT**	
C1	1627100300	SUCTION CONVEYOR Ø80	1
C2	4022200307	OR 6287 VIT.	1
C3	4026103002	SCREW TE M12X30 UNI5739 GALV.	2
C4	4026350709	WASHER GROWER 12 FLAT SEC. GALV.	2
2	**1852108900**	**FIXED SUCTION CONVEYOR Ø76 KIT**	
C1	1627100200	SUCTION COVEYOR Ø76	1
C2	4022200307	OR 6287 VIT.	1
C3	4026103002	SCREW TE M12X30 UNI5739 GALV.	2
C4	4026350709	WASHER GROWER 12 FLAT SEC. GALV.	2
3	**1852109000**	**TURNING CONVEYOR Ø76 KIT**	
C5	1610100000	CONVEYOR FLANGE	1
C6	1627100500	CONVEYOR Ø76	1
C7	4022200307	OR 6287 VIT.	1
C8	4026103002	SCREW TE M12X30 UNI5739 GALV.	2
C9	4026350709	WASHER GROWER 12 FLAT. SEC. GALV.	2
4	**1852111600**	**FLANGE 2" ½ NPT KIT**	
F1	1610101400	FLANGE 2" ½ NPT	1
F2	1680614500	MANIFOLD GASKET	1
F3	4026121711	SCREW TCEI 8,8 M12X40 GALV.	2
F4	4026350508	WASHER GROWER 12 GALV.	2
5	**18521CNGB0**	**SUCTION FILTER KIT**	
6		**FLANGED MANIFOLD**	
F1	1627505500	FLANGED MANIFOLD	1
F2	1680611400	DISCHARGE SIDE MANIFOLD GASKET	1
F3	1680611500	SUCTION SIDE MANIFOLD GASKET	1
F4	4026102807	SCREW TE 8,8 M8X25 UNI5931 GALV.	12
F5	4026135504	SCREW 12,9 M10X10 GALV.	1
F6	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	12
7		**THREADED MANIFOLD**	
F2	1680611400	DISCHARGE SIDE MANIFOLD GASKET	1
F3	1680611500	SUCTION SIDE MANIFOLD GASKET	1
F4	4026102807	SCREW TE 8,8 M8X25 GALV.	12
F5	4026135504	SCREW 12,9 M10X10 GALV.	1
F6	4026350706	WASHER GROWER 8 GALV.	12
F7	1627505600	THREADED MANIFOLD	1
8	**143029K2B0**	**KIT HYDRAULIC ACTUATOR**	
I1	143027T6B0	CILINDER	1
I2	150206XXB0	LEVER	1
I3	151309JVB0	BASE	1
I4	1608503200	MANIFOLD	1
I5	1623100800	COVER	1
I6	16240A0IB0	SPACER	1
I7	1624202300	SPACER	1
I8	164206XYB0	ACTUATOR PROTECTION	1
I9	1680700200	GASKET	1
I10	1685002800	WASHER FE 30X8,5 SP.4 GALV.	1
I11	168509U0B0	WASHER	1
I12	1691000000	SPRING	1
I13	4022100100	GREASER M6X1	1
I14	4022100107	GREASER 45	1
I15	4022200030	SEAL 41X27X10	1
I16	4026120405	SCREW TCEI M8X25	4
I17	4026121405	SCREW TCEI M8X20 GALV.	2
I18	4026135414	SCREW M8X45 ZINC.	1
I19	4026155705	SCREW TSPEI M8X16 GALV.	1
I20	4026308005	NUT M8 ESAG.GALV.	4
I21	4026350505	WASHER GROWER 8 GALV.	6
I22	4026510012	SEEGER E14	1

Pos.	Code	Description	Q.ty
9	**143028B7B0**	**PNEUMAT. OPERATED 4-WAY VALVE KIT**	
P1	160858KNB0	PNEUMATIC ACTUATOR COCK	1
P2	161258B4B0	PNEUMATIC ACTUATOR SUPPORT	1
P3	1640580QB0	PNEUMATIC ACTUATOR COVER	1
P4	167007ZAB0	PNEUMATIC ACTUATOR NUT	1
P5	1680700200	COVER GASKET	1
P6	168409PQB0	COCK REGULATION FERRULE	1
P7	168529TFB0	COCK REGULATION SPACER	1
P8	1691000200	COCK SPRING	1
P9	4022100100	SPHERICAL GREASER M6X1	1
P10	4022200005	SEAL 37X27X7	1
P11	4022200330	OR 3375	1
P12	4022200331	OR 2137	1
P13	4026102804	SCREW TE M8X16 UNI5739 ZINC.	4
P14	4026102807	SCREW TE M8X25 UNI5739 ZINC.	4
P15	4026121405	SCREW TCEI M8X20 UNI5931 ZINC.	4
P16	4026350505	WASHER GROWER 8 GALV.	4
P17	4026351505	WASHER M8 ZINC.	8
P18	4027100405	PNEUMATIC ACTUATOR	1
P19	4027421206	CONNECTION R15 6XG1/8	2
10		**HYDRAULIC DRIVE**	
H1	1470106700	HDR RV COUPLING	1
H2	1610052300	HDR RV FLANGE COUPLING	1
H3	1612501000	HDR MOTOR MOUNTING FLANGE	1
H4	1617015500	TAB RV360-520 HDR	1
H5	16171001E0	SQUARE HDR	1
H6	1622010200	RV CONVEYOR DOWEL PIN	4
H7	1624042300	HDR RV COUPLING SEAL SPACER	2
H8	1627105200	RV CONVEYOR WITH SUPPORT	2
H9	1642008400	CONVEYOR WITH SUPPORT PROTECTION	2
H10	4022200011	SEAL A 64X80X8 NBR	2
H11	4024107009	RV360 HYDRAULIC MOTOR	1
H12	4026103004	SCREW TE 8,8 M12X40 UNI5739 GALV.	4
H13	4026103111	SCREW TE 8,8 M14X45 GALV.	4
H14	4026121409	SCREW TCEI 8,8 M8X40 UNI5931 GALV.	3
H15	4026121713	SCREW TCEI 8,8 M12X80 UNI5931 GALV.	2
H16	4026121719	SCREW TCEI 8,8 M10X60 UNI5931 GALV.	4
H17	4026121815	SCREW TBEI 10,9 M10X15 GALV.	8
H18	4026122005	SCREW 12,9 M8X12	8
H19	4026136005	SCREW 12,9 M8X20	1
H20	4026136009	SCREW TCEI 8,8 M8X40 UNI5931 GALV.	1
H21	4026171203	SCREW 8,8 M12X40 GALV.	2
H22	4026305508	SELF-LOCKING NUT M12	4
H23	4026350505	WASHER GROWER 8 GALV.	6
H24	4026350506	WASHER GROWER 10 GALV.	8
H25	4026350508	WASHER GROWER 12 GALV.	8
H26	4026350709	WASHER GROWER 12 FLAT SEC. GALV.	4
H27	4026350710	WASHER GROWER 14 FLAT SEC. GALV.	4
H28	4026357006	FLAT WASHER M10 GALV.	8
H29	4026359001	WASHER 40X33,5X1,5	1
H30	4026510040	SEEGER E63 UNI7435-30	2
H31	4026711003	SAE G1"1/4 FLANGE	1
H32	4026711004	SAE G1"1/2 FLANGE	1
H33	4026904003	PLUG G1 GALV.	1
11	**1892006300**	**COMPLETE JOINT KIT RV HDR**	**1**

RV 520

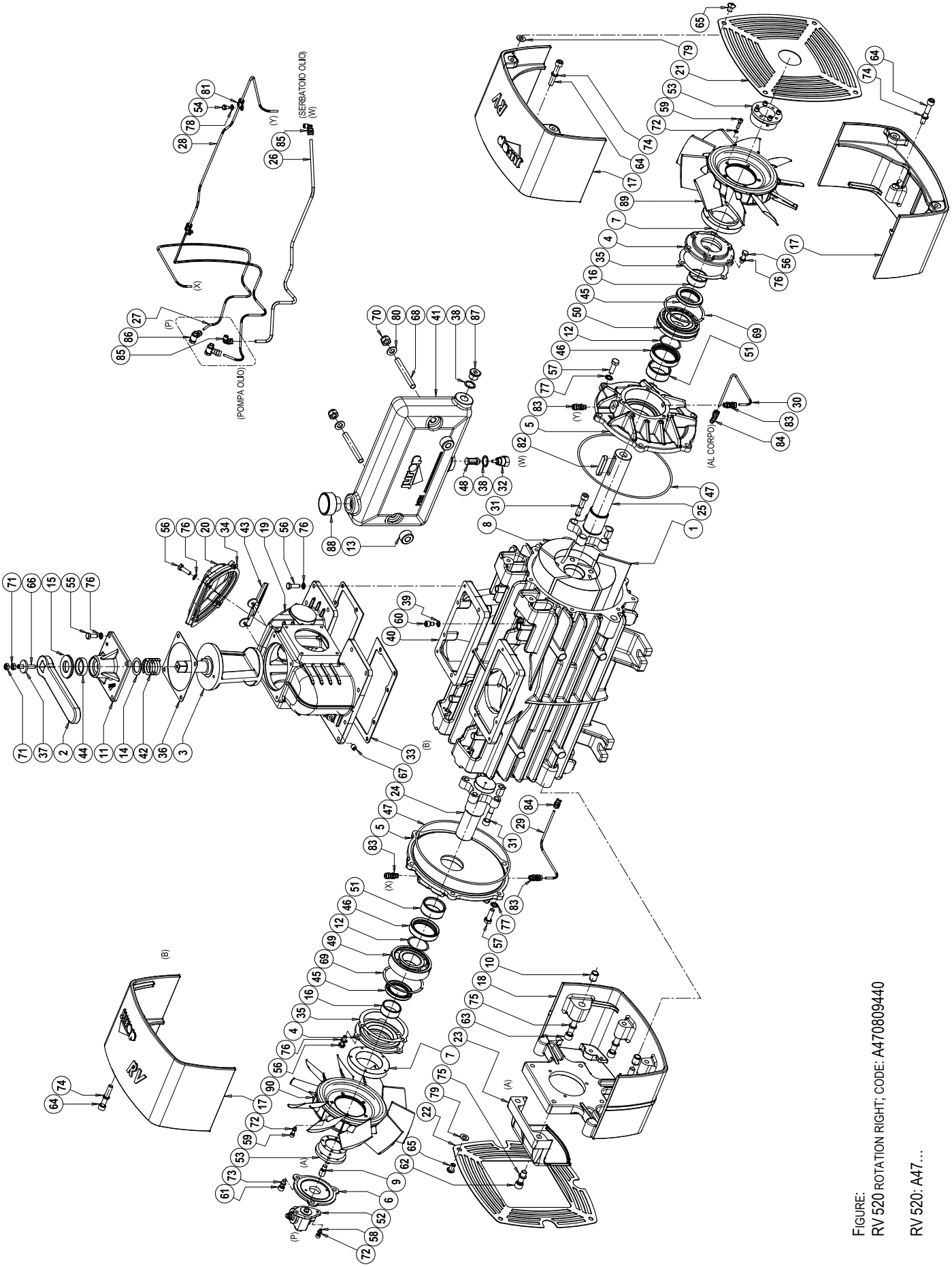


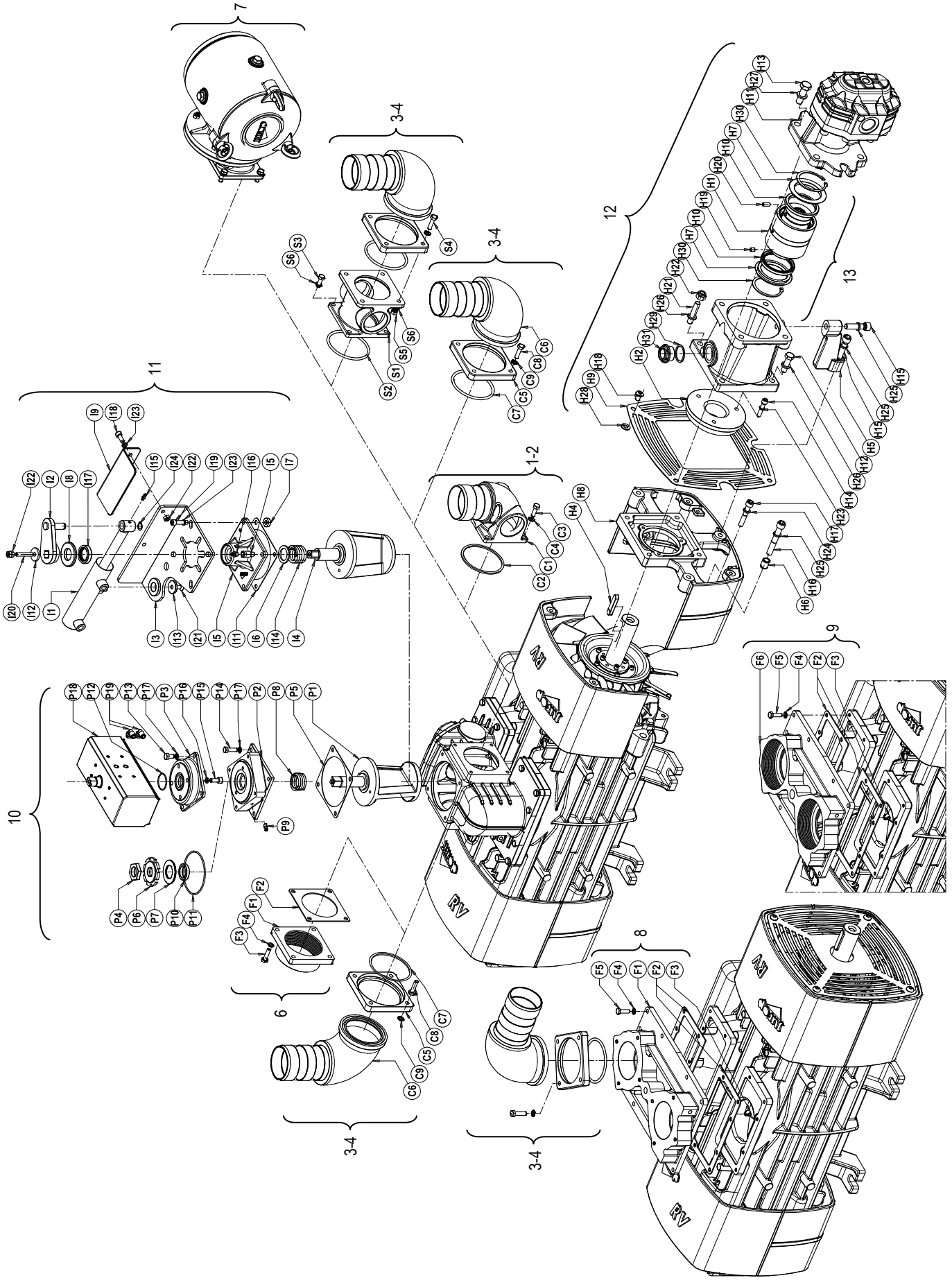
FIGURE:
RV 520 ROTATION RIGHT; CODE: A470809440

RV 520: A47...

RV 520

Pos.	Code	Description	Q.ty
1	1601606900	RV520 VANE	5
2	1605500100	COCK HANDLE	1
3	1608502500	COCK	1
4	1610508200	SEAL CAP	2
5	1610513900	RV FLANGE	2
6	16105CF2B0	OIL PUMP FLANGE	1
7	1611001400	RV FAN HUB	2
8	1621507900	RV520 ROTOR	1
9	1622002600	OIL PUMP DRIVE	1
10	1622010200	RV CONVEYOR DOWEL PIN	2
11	1623100500	COCK COVER	1
12	1624042100	RV520 DISTANCE RING	2
13	1624042800	SPACER	2
14	162409YKB0	SPACER	1
15	1624202300	COCK REGULATION SPACER	1
16	1626001100	SEAL BUSHING	2
17	1627105100	RV CONVEYOR	3
18	1627105200	RV CONVEYOR WITH SUPPORT	1
19	16275007E0	MANIFOLD	1
20	16401008E0	COVER	1
21	1642008300	ANTERIOR RV CONVEYOR PROTECTION	1
22	1642008400	CONVEYOR WITH SUPPORT PROTECTION	1
23	1642100200	REAR OIL PUMP PROTECTION	1
24	1650022100	REAR RV SHAFT	1
25	1650022200	ANTERIOR RV SHAFT	1
26	16630050E0	PIPE TANK RV520 RH	1
	16630051E0	PIPE TANK RV520 LH	1
27	1663064300	OIL PUMP – REAR FLANGE OIL LINE DH	1
	1663069900	OIL PUMP – REAR FLANGE OIL LINE SH	1
28	1663064500	OIL PUMP – ANTERIOR FLANGE RV520 RH	1
	1663065100	OIL PUMP – ANTERIOR FLANGE RV520 LH	1
29	1663064700	REAR RH/ANTERIOR LH HOUSING OIL LINE	1
	1663064900	ANTERIOR RH/REAR LH HOUSING OIL LINE	1
30	1663064900	ANTERIOR RH/REAR LH HOUSING OIL LINE	1
	1663064700	REAR RH/ANTERIOR LH HOUSING OIL LINE	1
31	1672001600	SPECIAL SCREW TCEI M10X1,5	10
32	1673001000	OIL FILTER PLUG	1
33	1680610200	MANIFOLD GASKET	2
34	16807011E0	MANIFOLD CAP GASKET	1
35	1680707300	SEAL CAP GASKET	2
36	1680707800	COCK COVER GASKET	1
37	1685002800	WASHER 30X8,5 GALV.	1
38	1685100300	WASHER D20	2
39	1685100800	WASHER 8X14X1,5 COPPER	2
40	1687509400	RV520 HOUSING	1
41	1687600000	OIL TANK	1
42	1691000000	COCK SPRING	1
43	18930008E0	CLAPET	1
44	4022200030	SEAL 41X27X10 GP NBR	1
45	4022200044	SEAL 65X45X8	2
46	4022200113	SEAL 70X55X15 VIT.	2
47	4022200309	OR 4875 VIT.	2
48	4022300001	NYLON D.6 OIL FILTER	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
53	4025428111	LOCKING SET RCK16 40X65	2
54	4026101301	SCREW TE 8,8 M 6X10 GALV.	2
55	4026102806	SCREW TE 8,8 M8X20 GALV.	7
56	4026102807	SCREW TE 8,8 M8X25 GALV.	18
57	4026102908	SCREW TE 8,8 M10X30 GALV.	12
58	4026121305	SCREW TCEI 8,8 M6X16 GALV.	2
59	4026121307	SCREW TCEI 8,8 M6X20 GALV.	10
60	4026121401	SCREW TCEI 8,8 M8X12 GALV.	2
61	4026121405	SCREW TCEI 8,8 M8X20 GALV.	3
62	4026121710	SCREW TCEI 8,8 M12X35 Z GALV.INC.	2
63	4026121719	SCREW TCEI 8,8 M12X80 GALV.	4
64	4026121815	SCREW TCEI 8,8 M10X60 GALV.	6
65	4026122005	SCREW TBEI 10,9 M10X15 GALV.	8
66	4026135414	SCREW 12,9 M8X45 GALV.	1
67	4026135504	SCREW 12,9 M10X10 GALV.	1
68	4026171211	SCREW STUD 8,8 M12X80	2
69	4026300025	COMPENSATION RING LMKAS100C	2
70	4026305508	SELF-LOCKING NUT M12	2
71	4026308005	NUT M8 GALV.	2
72	4026350503	WASHER GROWER 6 GALV.	12
73	4026350505	WASHER GROWER 8 GALV.	3
74	4026350506	WASHER GROWER 10 GALV.	6
75	4026350508	WASHER GROWER 12 GALV.	6
76	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	25
77	4026351506	WASHER M10 GALV.	12
78	4026357003	FLAT WASHER M6 GALV.	2
79	4026357006	FLAT WASHER M10 GALV.	8
80	4026357007	FLAT WASHER M12 GALV.	2
81	4026426703	RUBBER BAND D.6,5	2
82	4026501006	TAB 12X8X56	1
83	4026702000	UNIV. DIR. CONNECTION 4XG1/8	4
84	4026706000	UNIV. 90° CONNECTION 4XG1/8	2
85	4026706003	UNIV. 90° CONNECTION 6XG1/8	2
86	4026706101	TURNING CONNECTION 4XG1/8	2
87	4026904503	PLUG M20X1,5	1
88	4026910103	PLUG G1	1
89	4028360000	FRONT FAN (FOR RV520 RIGHT VERSION)	1
	4028360001	FRONT FAN (FOR RV520 LEFT VERSION)	1
90	4028360001	REAR FAN (FOR RV520 RIGHT VERSION)	1
	4028360000	REAR FAN (FOR RV520 LEFT VERSION)	1
	1892006000	KIT GASKET RV 520	1
	1892006400	KIT SHAFT ANTERIEUR RV 360-520	1
	1892006500	KIT REAR SHAFT RV 360-520	1

RV 520 - ACCESSORIES



RV 520 Accessories

Pos.	Code	Description	Q.ty
1	**1852103400**	**FIXED SUCTION CONVEYOR Ø80 KIT**	
C1	1627101300	SUCTION CONVEYOR Ø80	1
C2	4022200310	OR 6362 VIT.	1
C3	4026102807	SCREW TE M8X25 GALV.	4
C4	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4
2	**1852103500**	**FIXED SUCTION CONVEYOR Ø100 KIT**	
C1	1627101200	SUCTION CONVEYOR Ø100	1
C2	4022200310	OR 6362 VIT.	1
C3	4026102807	SCREW TE M8X25 GALV.	4
C4	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4
3	**1852103900**	**TURNING CONVEYOR Ø80 KIT**	
C5	1610101100	CONVEYOR FLANGE	1
C6	1627102700	CONVEYOR Ø80	1
C7	4022200310	OR 6362 VIT.	1
C8	4026102808	SCREW TE M8X30 UNI5739 GALV.	4
C9	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4
4	**1852104000**	**TURNING CONVEYOR Ø100 KIT**	
C5	1610101100	CONVEYOR FLANGE	1
C6	1627102400	CONVEYOR Ø100	1
C7	4022200310	OR 6362 VIT.	1
C8	4026102808	SCREW TE M8X30 UNI5739 GALV.	4
C9	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	4
5	**1852104100**	**KIT FOR SAFETY VALVE**	
S1	1627102500	SAFETY VALVE G2 SUPPORT	1
S2	4022200310	OR 6362 VIT.	1
S3	4026102807	SCREW TE 8,8 M8X25 UNI5739 GALV.	4
S4	4026102810	SCREW TE 8,8 M8X40 UNI5739 GALV.	4
S5	4026308005	NUT M8 UNI5588 GALV.	4
S6	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	8
6	**1852111700**	**FLANGE 3" NPT KIT**	
F1	1610101500	FLANGE 3" NPT	1
F2	1680709900	MANIFOLD GASKET	1
F3	4026102808	SCREW TCEI 8,8 M8X30 GALV.	4
F4	4026350706	WASHER GROWER 8 GALV.	4
7	**185212L4B0**	**SUCTION FILTER KIT COMPONENTS**	
8		**FLANGED MANIFOLD**	
F1	1627504800	FLANGED MANIFOLD	1
F2	1680610200	MANIFOLD GASKET	2
F3	4026135504	SCREW 12,9 M10X10 GALV.	1
F4	4026350706	WAHER GROWER 8 FLAT SEC. GALV.	12
F5	4026102807	SCREW TE 8,8 M8X25 UNI5931 GALV.	12
9		**THREADED MANIFOLD**	
F2	1680610200	MANIFOLD GASKET	2
F3	4026135504	SCREW 12,9 M10X10 GALV.	1
F4	4026350706	WASHER GROWER 8 FLAT SEC. GALV.	12
F5	4026102807	SCREW TE 8,8 M8X25 UNI5931 GALV.	12
F6	1627504900	THREADED MANIFOLD	1

Pos.	Code	Description	Q.ty
10	**143028GZB0**	**PNEUM. OPERATED 4-WAY VALVE KIT**	
P1	160858KBB0	PNEUMATIC ACTUATOR COCK	1
P2	161258H0B0	PNEUMATIC ACTUATOR SUPPORT	1
P3	1640580QB0	PNEUMATIC ACTUATOR COVER	1
P4	167007ZAB0	PNEUMATIC ACTUATOR NUT	1
P5	1680707800	COVER GASKET	1
P6	168409PQB0	COCK REGULATION FERRULE	1
P7	168529TFB0	COCK REGULATION SPACER	1
P8	1691000200	COCK SPRING	1
P9	4022100100	SPHERICAL GREASER M6X1	1
P10	4022200005	SEAL 37X27X7	1
P11	4022200330	OR 3375	1
P12	4022200331	OR 2137	1
P13	4026102804	SCREW TE M8X16 UNI5739 GALV.	4
P14	4026102807	SCREW TE M8X25 UNI5739 GALV.	4
P15	4026121405	SCREW TCEI M8X20 UNI5931 GALV.	4
P16	4026350505	WASHER GROWER 8 GALV.	4
P17	4026351505	WASHER M8 ZINC.	8
P18	4027100405	PNEUMATIC ACTUATOR	1
P19	4027421206	CONNECTION R15 6XG1/8	2
11	**143029KRB0**	**KIT HYDRAULIC ACTUATOR**	
I1	143027T6B0	CILINDER	1
I2	15020A10B0	LEVER	1
I3	1513007TJB0	BASE	1
I4	1608502900	MANIFOLD	1
I5	1623100700	COVER	1
I6	162409YKB0	SPACER	1
I7	1624043400	SPACER	1
I8	1624202300	SPACER	1
I9	164206XYB0	ACTUATOR PROTECTION	1
I10	1673009700	GREASER LINK	1
I11	1680707800	GASKET	1
I12	1685002800	WASHER 30X8,5 GALV.	1
I13	168509U0B0	WASHER	1
I14	1691000000	SPRING	1
I15	4022100100	GREASER M6X1	1
I16	4022100107	GREASER 45ø M10X1	1
I17	4022200030	SEAL 41X27X10	1
I18	4026121408	SCREW TCEI M8X25	4
I19	4026121405	SCREW TCEI M8X20 GALV.	2
I20	4026135414	SCREW M8X45	1
I21	4026155705	SCREW TSPEI M8X16	1
I22	4026308005	NUT M8 HEXAG. GALV.	4
I23	4026350505	WASHER GROWER 8 GALV.	6
I24	4026510012	ELASTIC SEAL E14	1

Pos.	Code	Description	Q.ty
12		**HYDRAULIC DRIVE**	
H1	1470106700	HDR RV COUPLING	1
H2	1610052300	HDR RV FLANGE COUPLING	1
H3	1612501000	HDR MOTOR MOUNTING FLANGE	1
H4	1617015500	TAB RV360-520 HDR	1
H5	16171001E0	SQUARE HDR	1
H6	1622010200	RV CONVEYOR DOWEL PIN	4
H7	1624042300	HDR RV COUPLING SEAL SPACER	2
H8	1627105200	RV CONVEYOR WITH SUPPORT	2
H9	1642008400	CONVEYOR WITH SUPPORT PROTECTION	2
H10	4022200011	SEAL A 64X80X8 NBR	2
H11	4024107001	RV520 HYDRAULIC MOTOR	1
H12	4026103004	SCREW TE 8,8 M12X40 GALV.	2
H13	4026103111	SCREW TE 8,8 M14X45 GALV.	4
H14	4026121409	SCREW TCEI 8,8 M8X40 GALV.	3
H15	4026121713	SCREW TCEI 8,8 M12X50 GALV.	2
H16	4026121719	SCREW TCEI 8,8 M12X80 GALV.	6
H17	4026121815	SCREW TCEI 8,8 M10X60 GALV.	6
H18	4026122005	SCREW TBEI 10,9 M10X15 GALV.	8
H19	4026136005	SCREW 12,9 M8X12	1
H20	4026136009	SCREW 12,9 M8X20	1
H21	4026171203	SCREW 8,8 M12X40 GALV.	2
H22	4026305508	SELF-LOCKING NUT M12	4
H23	4026350505	WASHER GROWER 8 GALV.	6
H24	4026350506	WASHER GROWER 10 GALV.	6
H25	4026350508	WASHER GROWER 12 GALV.	10
H26	4026350709	WASHER GROWER 12 GALV.	4
H27	4026350710	WASHER GROWER 14 GALV.	4
H28	4026357006	FLAT WASHER M10 UNI6592 GALV.	8
H29	4026359001	WASHER 40X33,5X1,5	1
H30	4026510040	SEEGER E63 UNI7435-30	2
H31	4026904003	PLUG G1 GALV.	1
13	**1892006300**	**COMPLETE JOINT KIT RV HDR**	**1**

9. 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

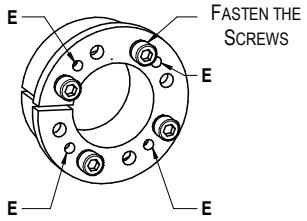
• Clean all the components: remove dirt and particles that can prevent a correct assembly.

• 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

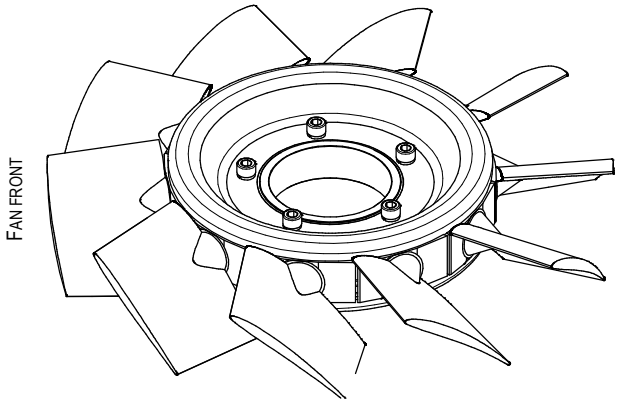
E: Threaded holes for disassembly

• Install the steel hub and the fan by means of the 5 screws and washers.

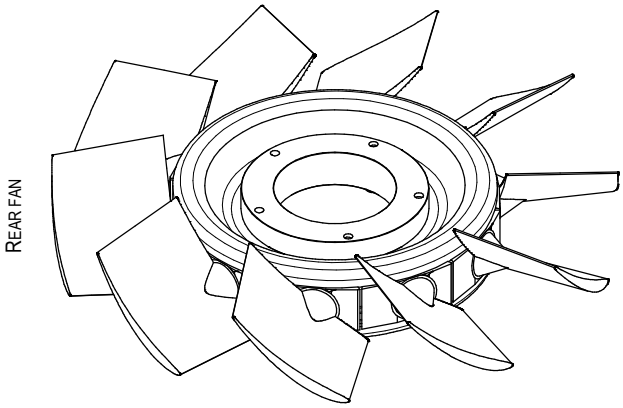
• Apply medium resistance thread-locker on the locking screw threads. Pour on the thread evenly.

• Fasten the screws following a cross shake pattern.

• Check the screw fastening twice to be sure they have been evenly tightened.



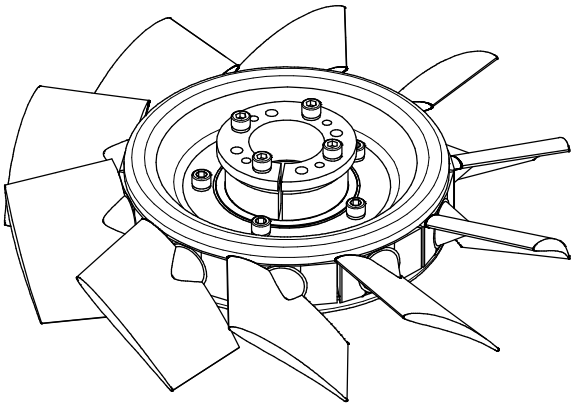
Pic. 9.2



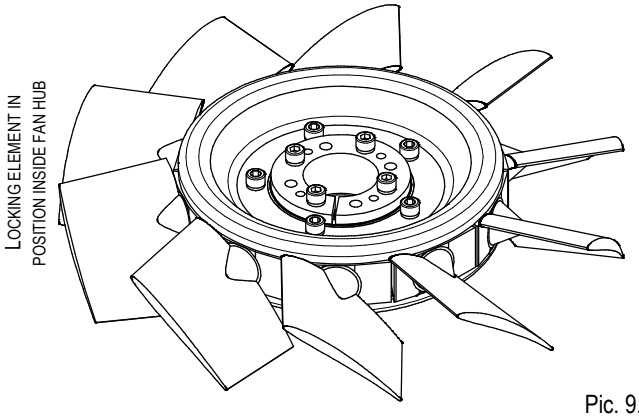
Pic. 9.3

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

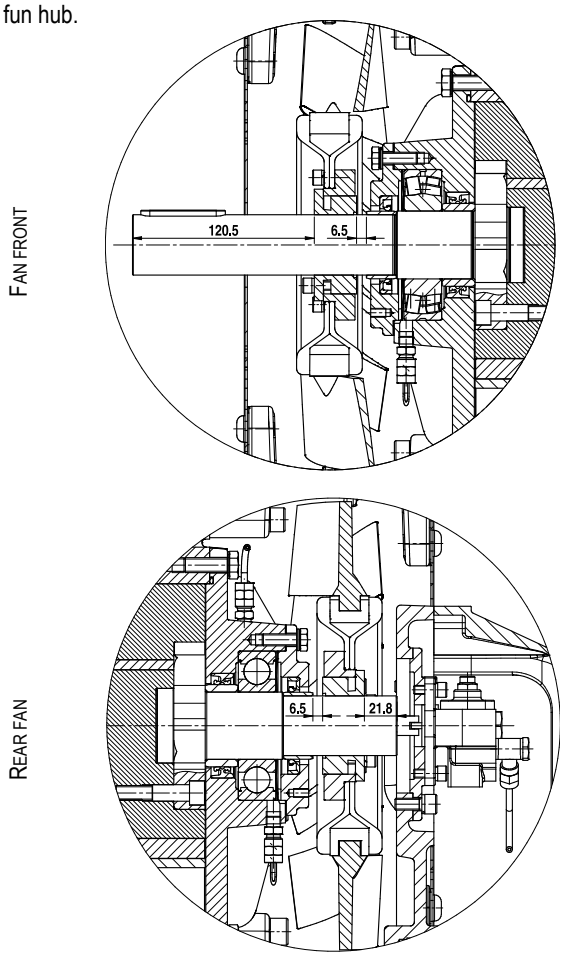
• Install pre assembled fan on the shaft.

• 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 fun hub.



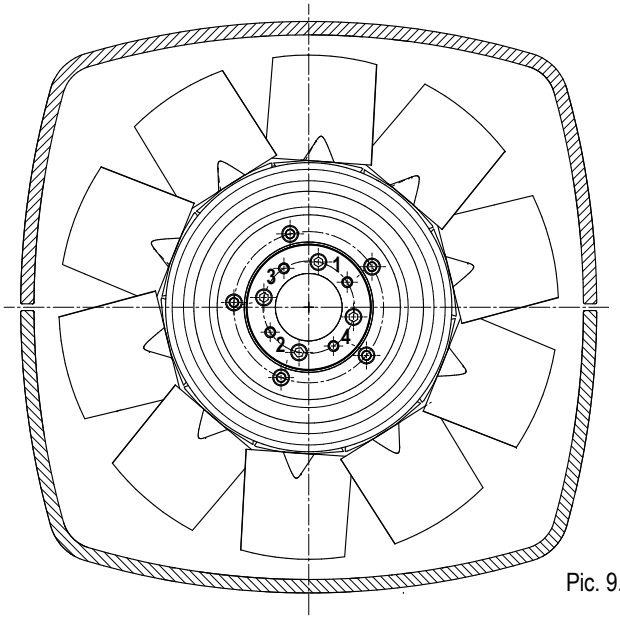
Pic. 9.6

• 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).

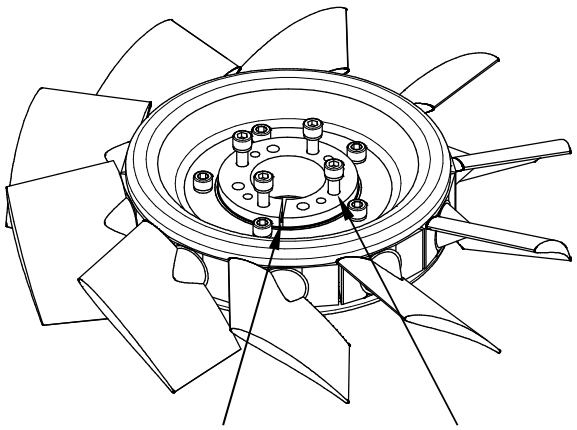
• If possible, use an impulse screwdriver.

• 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	09	21-03-2016	U.T.	A.T.

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