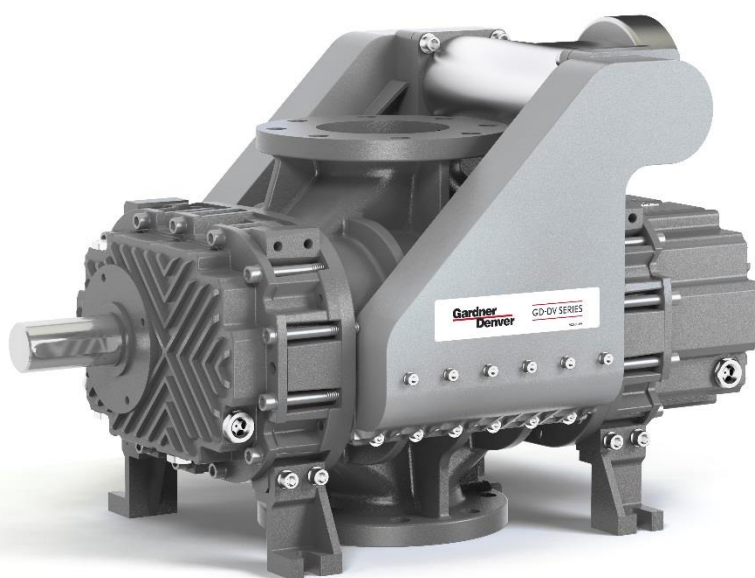




## **OPERATING AND SERVICE MANUAL**

### **Deep Vacuum (GD-DV) Blower**



**GDDV-7-100**

**Version 01**


**Aug 18, 2016**


## GENERAL INFORMATION

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This manual is integral part of the machine, follow strictly the instructions given in this manual prior to positioning and operating the blower.

For a quick and rational reading of this manual observe the following statements and definitions:

 **Warning:** Signals the risk of serious physical dangers to people and/or serious danger to blower.

 **Note:** Signals important technical information for the operation of the blower.

### ***Qualified personnel***


It means these persons who, on account of their training, experience and instruction and their knowledge of relevant standards, specifications, accident prevention rules and operating conditions, have been authorized by those responsible for the safety of the plant to carry out the necessary work on the blower and who can recognize and avoid any possible dangers.

Acknowledge of first aid is also required as is information about local rescue facilities.

The blower is a rotary lobe compressor suitable only for industrial use as described in this Manual.

Any other use is to be considered improper and is therefore forbidden.

The blower must be installed in a safe area, accessible only by qualified personnel.

 **Warning:** Non-qualified personnel are not permitted to work on or near the blower.

The personnel in charge must be well acquainted with this Manual, and then conserve carefully the Manual in a known site in order that it is available for future consultations.

The maintenance operations are to be carried out by qualified personnel following the instructions given in this Manual and using only original spare parts.

Gardner Denver will not be liable for any damage, breakdown, injury deriving from the non-pursuance of the instructions and directives stated in this Manual, from the non-pursuance of the current regulations and from the non-pursuance of the due care during the handling, service operations or repair, also if they are not specially indicated in this Manual .

The Manual is prepared with the technical knowledge's known at the moment of sale of the blower, therefore it cannot be considered inadequate in case of new knowledge's achieved after the sale of the blower.

In case further information or revisions are requested please contact:

**Gardner Denver Inc.**

**Tel.:** +1 (800) 682-9868

**Fax:** +1 (217) 221-8780

**E-mail:** [pd.blowers@gardnerdenver.com](mailto:pd.blowers@gardnerdenver.com)

Quoting always the type and the serial number printed on the nameplate fixed to the blower.

All rights on this Manual are reserved to Gardner Denver Total or partial reproduction of this manual is permitted only with Gardner Denver written authorization.

## SAFETY INFORMATION

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Delivery of GARDNER DENVER does not include the design of the operating environment where the blower will be installed, nor the power circuits, control circuits and other controls or equipment's required by the specific function of the blower.

The CUSTOMER therefore must verify that the operating environment, the power circuits, the control circuits and the other controls or equipment's related to the function of the blower satisfy the essential safety requirements of the European Machinery Directive 89/392/EEC and/or of the corresponding legislation of the country where the blower is used.

The CUSTOMER must also ensure that the valid legislation on electric safety (Low-Voltage Directive) and Electromagnetic Compatibility of equipment (EMC Directive) is followed.


 **Warning:** All the personnel that come in contact with the blower must observe following safety regulations.

### During blower operation

- Do not touch external surfaces of the blower and of the outlet silencer: surfaces temperature above 70 °C (158 °F)
- Do not open oil plugs during operation
- Do not disassemble transmission guard
- Do not approach blower without suitable clothing (avoid large clothes, neckties, bracelets or necklaces)
- Do not use the blower in operating conditions different from the ones rated in the order confirmation
- Do not touch components under electric supply
- Dispose of fire-fighting equipment close to the blower

### Before any staff service on blower

Stop the blower and auxiliary system as described at para 5.4

 **Warning:** Disconnect the electric supply, lock the general switching open position with the key and conserve it during the service operation.

 **Warning:** Insulate the blower from the plant and restore the atmospheric pressure into it.


 **Warning:** The gas contained in the plant may be hot, toxic and irritant.

 **Warning:** Wait until the blower returns at the ambient temperature (< 40 °C [104 °F]).

### During staff service on blower

- Check that all the operations indicated above have been completed.
- Lift the blower and the main piping by suitable equipment only.
- During cleaning operations, involving the use of sprays or cleaning agents, special attention is to be paid to relevant user information to avoid the poisoning due to fumes or burns due to caustic substances.

 **Warning:** Do not use non-original spare parts or accessories.

 **Note:** GARDNER DENVER will not be liable for any damage, breakdown, and injury deriving from the use of non-original spare parts or accessories.

## BLOWER IDENTIFICATION

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Manufacturer	<b>Gardner Denver Inc.</b>
Address	<b>1800 Gardner Expressway, Quincy, IL 62305</b>
Tel.	<b>+1-800-682-9868</b>
Fax.	<b>+1-217-221-8780</b>
email	<a href="mailto:pd.blowers@gardnerdenver.com">pd.blowers@gardnerdenver.com</a>

Type			
S/N			
Manufacturing year			
Conveied gas			
Absolute intake pressure	P1	mbar [PSI]	
Intake temperature	T1	°C [°F]	
Inlet capacity	Q1	m3/h [CFM]	
Discharge absolute pressure	P2	mbar [PSI]	
Differential pressure	P2 - P1	mbar [PSI]	
Discharge temperature	T2	°C [°F]	
Blower speed	n	rpm	
Absorbed power	N	kW [HP]	
Motor power		kW [HP]	
Motor speed		rpm	
Noise	SPL	dB [A]	

## WARRANTY CONDITIONS

The blower, if not stated otherwise by the contract, is guaranteed for 12 months of operation and in any case for a maximum of 18 months after the delivery.

The warranty applies only if the contractual and administrative norms have been observed and if the installation of the blower and its use comply with the instructions of this manual.

The damaged or defective parts due to manufacturing faults will be repaired or replaced free of charge.

The following are excluded from this warranty: all parts subject to wear (air filter, bearings etc...), transport costs and the costs of the intervention of our technicians for operational faults not due to manufacturing defects.

The warranty excludes any responsibility for direct or indirect damage to people and/or objects caused by improper use or inadequate maintenance of the blower and are limited only to manufacturing defects.

The warranty is considered void in the event of tampering or changes (even small ones) and use of non-original spare parts.

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## 1. BLOWER CHARACTERISTICS

### 1.1 Operating principle

GD-DV series blowers are positive displacement exhausters comprising two conjugate shaped rotors 2 which rotate inside a Figure 8 shaped body 1.

The gas enters the blower at pressure  $P_1$ , below the atmospheric pressure, and temperature  $T_1$  and it is trapped in the volume  $V$ .

The compression of entrained air is carried out by the injection of cold atmospheric air in the volume  $V$  through the nozzles 3.

The capacity is proportional to the speed of rotation and is almost constant when the operating pressure varies.

- $P_1$  Inlet absolute pressure
- $T_1$  Inlet temperature
- $P_2$  Outlet absolute pressure
- $T_2$  Outlet temperature
- $T_3$  Injection air temperature
- 
- 

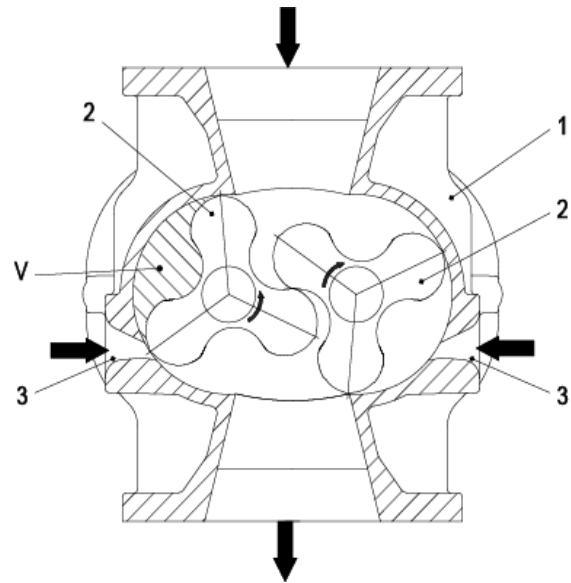


Figure 1

### 1.2 Construction

The body 1 is closed at both ends by covers 5A and 5B in which the seals 45 and bearings 31, 32 and 33 are located. The rotors 2 are synchronized by means of a gear with involute toothed wheels 11A and 11B.

The shafts have labyrinth seals, gas leaks are collected into special air spaces in the covers and are discharged into the atmosphere.

Two sumps 12A and 12B are mounted on the covers which act as oil tanks for the bath lubrication of the bearings and of the synchronized gear.

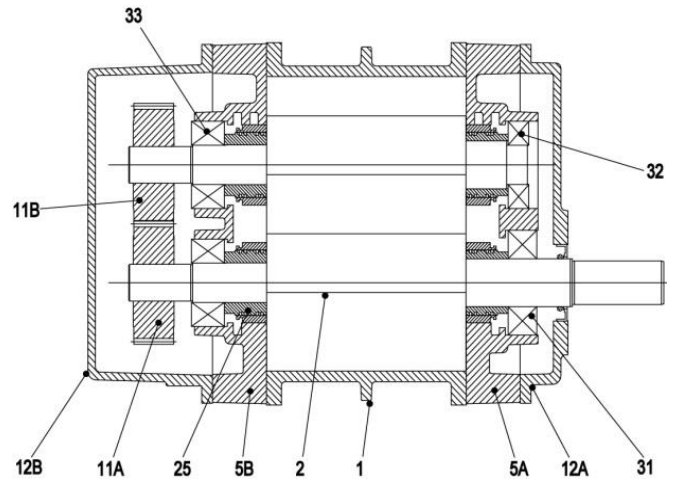


Figure 2




**Note:** For a detailed description of the blower materials and all its components see also the catalogue or consult our technical service.


## 2. PERFORMANCE LIMITS AND WORKING CONDITIONS

### 2.1 Operating environment and conveyed gas

The blower is suitable to operate only in dust free environment, with no-explosive or corrosive atmosphere and to convey only atmospheric air.

The atmospheric air injection can be kept only from the ambient of installation.

 **Warning:** The blower is not suitable to convey explosive, toxic or dangerous gases.

 **Warning:** The suction of liquids damages the blower.

### 2.2 Performance limits

Size	RPM			P1		P2-P1	T1		T2	T2-T1	T3	
	MAX		MIN	(mbar) [PSI]		(mbar) [PSI]	(°C) [°F]		(°C) [°F]	(°C) [°F]	(°C) [°F]	
	/F/V/SP	/H		MAX	MIN	MAX	MAX	MIN	MAX	MAX	MAX	MIN
45	5000	3400	1000	500 [7.252]	150 [2.176]	1000 [14.504]	50 [122]	-25 [-13]	150 [302]	130 [266]	50 [122]	-25 [-13]
65	4800	2800	900	500 [7.252]	150 [2.176]	1000 [14.504]	50 [122]	-25 [-13]	150 [302]	130 [266]	50 [122]	-25 [-13]
85	3800	2500	700	500 [7.252]	150 [2.176]	1000 [14.504]	50 [122]	-25 [-13]	150 [302]	130 [266]	50 [122]	-25 [-13]
105	3000	2400	550	500 [7.252]	150 [2.176]	1000 [14.504]	50 [122]	-25 [-13]	150 [302]	130 [266]	50 [122]	-25 [-13]
125	2400	1800	450	500 [7.252]	150 [2.176]	1000 [14.504]	50 [122]	-25 [-13]	150 [302]	130 [266]	50 [122]	-25 [-13]
145	2000	1500	350	500 [7.252]	150 [2.176]	1000 [14.504]	50 [122]	-25 [-13]	150 [302]	130 [266]	50 [122]	-25 [-13]

### 2.3 Flow adjustment

- Change transmission ratio
- Change frequency of the motor
- Use a two-speed motor
- Discharge excess flow and silence it


 **Warning:** Do not use relief valve to discharge excess flow.

 **Warning:** Do not recirculate flow to blower inlet.

 **Warning:** Do not adjust flow by throttling inlet or outlet pipe.

### 2.4 Noise level

Noise level of the blower is indicated at page 3 as Sound Pressure Level according to ISO 3476 at 1m (3.28 ft.) distance from the blower and in free air (tolerance +/- 2dB(A)).

 **Warning:** For high compression ratio and for high speed of rotation noise level of blower can be higher than 85 dB (A).



## 2.5 Forbidden uses

Forbidden Use	Risk	Measures
Operation in explosive atmosphere	Fire and explosion	Forbidden use
Suction of explosive, toxic and dangerous gases	Fire and explosion Environment pollution Risk of operators health	
Operation with free nozzles	Environment pollution Risk of operators health	
Suction of liquids	Blower stall and ejection of parts	Install a liquid separator on the suction nozzle of the blower
Operation with shut off valve locked	Overheating Fire Blower stall and ejection of parts	Inform the qualified personnel charged with the blower
Operation with wrong direction of rotation	Ejection of dangerous substances Blower stall and ejection of parts	
Operation with speed higher than the maximum one	Blower stall and ejection of parts	Use suitable limits to the motor speed when it is supplied with frequency converter
Operation with speed lower than the minimum one		
Operation with pressure higher than the maximum one P1	Ejection of dangerous substances	Use a safety pressure switch when the blower sucks from a closed circuit
Operation with pressure lower than the minimum one P1	Blower stall and ejection of parts	
Operation with pressure higher than the maximum one P2 - P1	Blower stall and ejection of parts	Set up the relief valve
Operation with temperature higher than the maximum one T1	Overheating, Fire, Blower stall and ejection of parts	Use a safety temperature switch when the blower sucks from a closed circuit
Operation with temperature lower than the minimum one T1	Blower stall and ejection of parts	
Operation with temperature higher than the maximum one T2	Overheating, Fire, Blower stall and ejection of parts	Use a safety temperature switch when the blower sucks from a closed circuit
Operation with temperature higher than the maximum one T2 - T1	Blower stall and ejection of parts	Use a differential temperature switch when the blower sucks from a closed circuit
Stopping the GD-DV UNIT with counter pressure	High current absorption Fire	Use a suitable stopping procedure

## 2.6 Residual risks

<b>Hazard UNI EN 1012-1 Compressor</b>	<b>Residual risk</b>
Cutting, severing, drawing in, trapping, entanglement, friction and abrasion	Do not approach the transmission guard with no suitable clothes. Advice in the manual. Protect cooling port properly to cutting and trapping risk.
Fluid ejection	Overcoming the operation limits (para. 2.2) can cause the risk of ejection of parts.
Ejection of parts	Overcoming the operation limits (para. 2.2) can cause the risk of ejection of parts.
Loss of stability	None
Electric installation	None. The electric equipment is not supplied by GARDNER DENVER
Electrostatic phenomena	
External influences on electrical equipment	
Thermal safety	The surface of the blower and of the discharge silencer can be higher than 70 °C [158 °F]. Label C.7 on the surfaces. Advice in the manual.
Noise	The sound pressure level can be higher than 85 dB (A). Wear the noise protection devices. Label C.2 on the inlet filter. Advice in the manual.
Suction of liquids	Forbidden use can cause the risk of suction of liquids.
Gas	Forbidden use can cause the risk of suction of dangerous gases.
Fire and explosion	Overcoming the operation limits (para 2.2) can cause the risk of fire and explosion. Operation with shut-off valve locked can produce the risk of fire. The not correct maintenance can cause the overheating and the risk of fire.
Failure of energy supply	Ejection of fluids and parts.

### 3. STORAGE

#### 3.1 Unpacking

Check always the correspondence between documents and materials and the presence of eventual damages due to transport.

**Warning:** Remove with care the packing and clearing all the dangerous elements (nails, splits, etc...).

#### 3.2 Handling

Blower	kg	lb.
45	97	214
65	159	351
85	250	551
105	400	882
125	610	1345
145	1099	2423

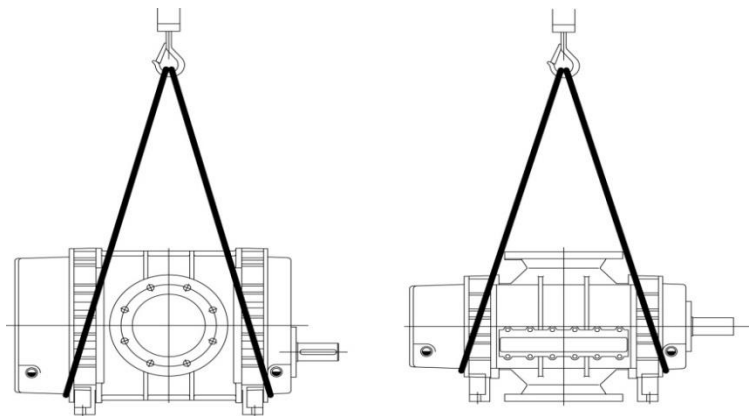


Figure 3

**Warning:** Do not use the holes in the flanges to lift the blower.

#### 3.3 Preservation

- Keep the blower in a place protected against solar radiation and at following climatic conditions:

<b>Temperature</b>	from	-20 °C [-4 °F]	to	40 °C [104 °F]
<b>Relative humidity</b>	from	10%	to	80%

- If different climatic conditions are forecast contact GARDNER DENVER.
- Do not remove the nozzle protections and renew the preservation every 6 month or more frequently if humidity is higher than 80% using anti-rust oil.

Parts	Anti-Rust oil	
	Type	Trade
Shiny external parts	Rustia 27 Rust Ban 397 V-Produkt 9703	AGIP ESSO SHELL
Gear and bearings	Rustia C 100 Antiruggine MZ 110 Ensis Motor Oil 20	AGIP ESSO SHELL
Compression chamber	Rustia C 100 Antiruggine MZ 45 Ensis Motor Oil	AGIP ESSO SHELL

**Warning:** Use anti-rust oil with fire point over 200 °C [392 °F].

**Warning:** Dispose the used anti-rust oil in accordance with local regulations.

## 4. INSTALLATION

### 4.1 On-site positioning of blower

The blower has to be set horizontally on a level surface and attached using screws which secure the feet or the outlet flange (/F e /SP version).

### 4.2 Changing the inlet/outlet arrangement

To move from the arrangement with inlet and outlet on a vertical axis to that with inlet and outlet on a horizontal axis and vice versa exchange the oil levels by changing the position of the plugs in accordance with Figure 4 on both blower sumps.

Pos	Description
Ps	Left foot
Pd	Right foot
Tc	Oil fill plug
Ts	Oil drain plug
T	Plugs
L	Oil level plugs

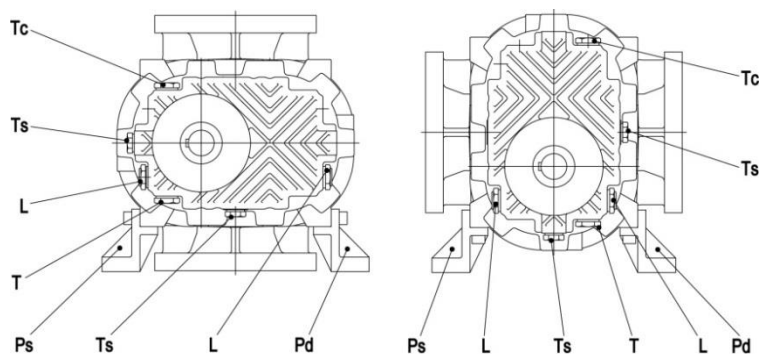


Figure 4

### 4.3 Direction of rotation – gas flow direction

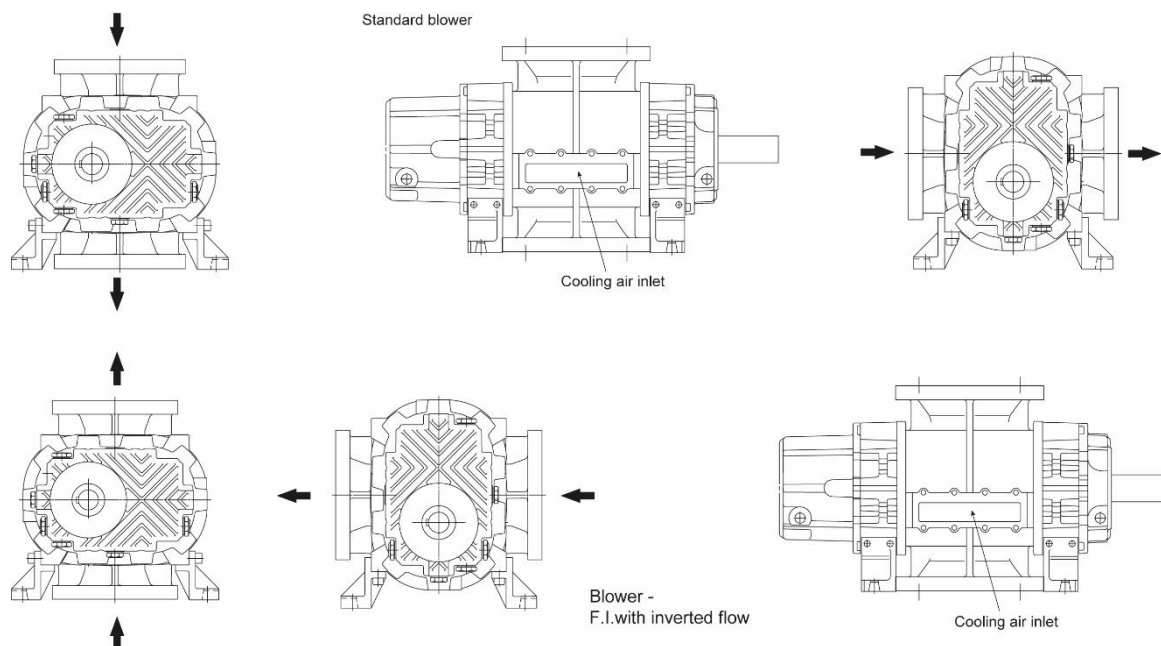


Figure 5

**Warning:** Do not use the blower with a direction of rotation or a flow direction different from that one shown in Figure 5.

## 4.4 Coupling

### 4.4.1 Direct coupling

1. Slide the half couplings onto the shaft of the blower and of the motor using suitable tools.

 **Warning:** Do not use a hammer to slide on the half couplings.

2. Secure the half couplings with security dowels which will push on the keys.
3. Place the blower at the distance S from the motor as indicated in the table below.
4. Align the shafts of the blower and of the motor by shims under the feet of the motor and/or blower.
5. Check the alignment by using comparators or gauges with scales as shown in Figure 6.

Coupling diameter (mm) [in.]	Distance S ( mm ) [in.]	Axial deviation Ka ( mm ) [in.]	Standard deviation	
			Radial Kr ( mm ) [in.]	Angular Kw ( mm ) [in.]
80 [3.150]	3 [0.118]	1 [0.039]	0.13 [0.005]	0.13 [0.005]
100 [3.937]	3 [0.118]	1 [0.039]	0.15 [0.006]	0.15 [0.006]
130 [5.118]	3 [0.118]	1 [0.039]	0.18 [0.007]	0.18 [0.007]
150 [5.906]	3 [0.118]	1 [0.039]	0.21 [0.008]	0.21 [0.008]
160 [6.299]	4 [0.157]	2 [0.079]	0.27 [0.011]	0.27 [0.011]
180 [7.087]	4 [0.157]	2 [0.079]	0.3 [0.012]	0.3 [0.012]
200 [7.874]	4 [0.157]	2 [0.079]	0.34 [0.013]	0.34 [0.013]
225 [8.858]	4 [0.157]	2 [0.079]	0.38 [0.015]	0.38 [0.015]
250 [9.843]	5.5 [0.217]	2.5 [0.098]	0.42 [0.017]	0.42 [0.017]
280 [11.024]	5.5 [0.217]	2.5 [0.098]	0.47 [0.019]	0.47 [0.019]
315 [12.402]	5.5 [0.217]	2.5 [0.098]	0.52 [0.020]	0.52 [0.020]
350 [13.780]	5.5 [0.217]	2.5 [0.098]	0.58 [0.023]	0.58 [0.023]

## Alignment check

$$S_{max} < S + K_a$$

$$S_{min} < S - K_a$$

$$K_v = 1.5 \frac{rpm}{3000}$$

$$\Delta r < K_r \times K_v$$

$$D_w = S_{max} - S_{min}$$

$$D_w < K_w \times K_r$$

$$\Delta r + D_w < K_w \times K_v$$

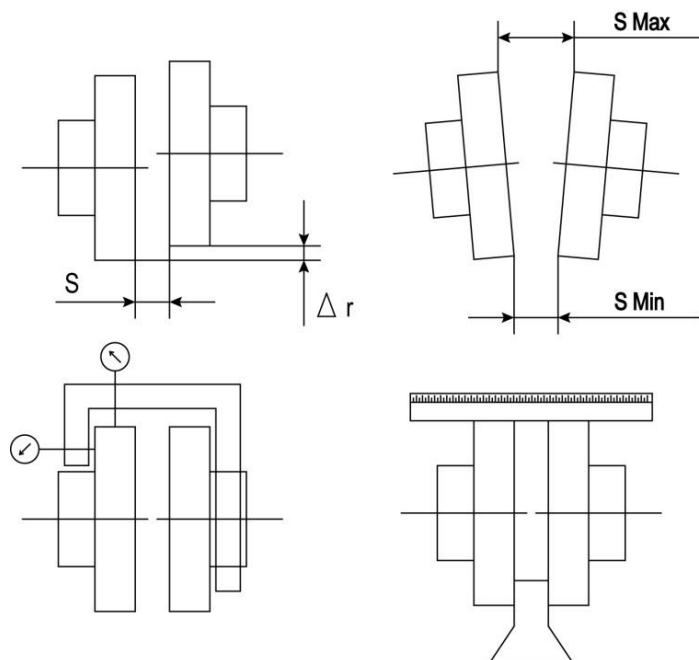


Figure 6

**Warning:** Alignment errors cause premature wearing of the bearings and flexible couplings.

### 4.4.2 Belt drive coupling

- Utilize pulleys with minimum diameter equal or major than the value indicated in the table below.

**Warning:** Do not use a hammer to mount the pulleys.

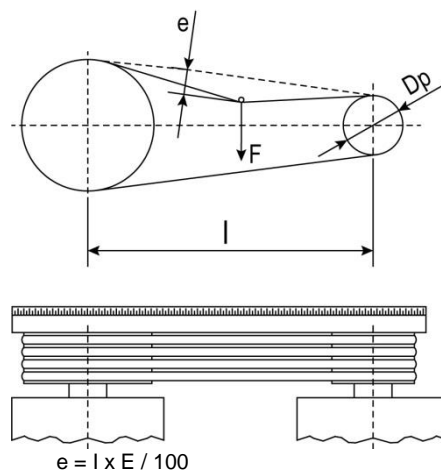
- Use suitable equipment to mount the pulleys onto the blower and motor shafts.

### Minimum allowed blower pulley pitch diameter

Size	Differential pressure ( mbar ) [PSI]								
	200 [2.901]	300 [4.351]	400 [5.802]	500 [7.252]	600 [8.702]	700 [10.153]	800 [11.603]	900 [13.053]	1000 [14.504]
45	80 [3.150]	80 [3.150]	80 [3.150]	90 [3.543]	100 [3.937]	106 [4.173]	112 [4.409]	118 [4.646]	125 [4.921]
65	80 [3.150]	80 [3.150]	80 [3.150]	90 [3.543]	100 [3.937]	106 [4.173]	112 [4.409]	118 [4.646]	125 [4.921]
85	100 [3.937]	106 [4.173]	112 [4.409]	118 [4.646]	125 [4.921]	132 [5.197]	140 [5.512]	150 [5.906]	160 [6.299]
105	112 [4.409]	118 [4.646]	125 [4.921]	132 [5.197]	140 [5.512]	150 [5.906]	160 [6.299]	180 [7.087]	200 [7.874]
125	118 [4.646]	125 [4.921]	132 [5.197]	140 [5.512]	150 [5.906]	160 [6.299]	180 [7.087]	200 [7.874]	225 [8.858]
145	125 [4.921]	132 [5.197]	140 [5.512]	150 [5.906]	160 [6.299]	180 [7.087]	200 [7.874]	225 [8.858]	250 [9.843]

- Mount the drive belts.
- Produce belt tension by using the motor thrust screws in accordance with the values shown in the table.

Belt profile	Force F [ daN ]	Force F [ lbf. ]	Diameter D of smaller pulley [ mm ]	Diameter D of smaller pulley [ in. ]	Constant E
SPZ XPZ	2.5	5.62	95 – 125 > 132	3.74 – 4.92 > 5.20	1.45 1.3
SPA XPA	5	11.24	100 – 140 150 – 200 > 224	3.94 – 5.51 5.91 – 7.87 > 8.82	2.3 2.1 2
SPB XPB	7.5	16.86	160 – 224 236 – 355 > 375	6.30 – 8.82 9.29 – 13.98 > 14.76	1.55 1.2 1.1
SPC XPC	12.5	28.10	250 – 355 375 – 560	9.84 – 13.98 14.76 – 22.05	1.8 1.6



**Figure 7**

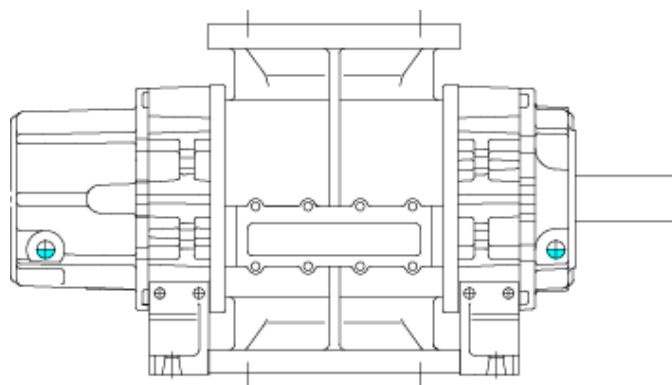
$e = l \times E / 100$ , where  $l$  is expressed in mm

**Warning:** Excessive belt tension could damage the blower and the motor.

- During this phase check the alignment of the pulley by using a scale as per Figure 7.
- Secure the feet of the motor.

## 4.5 System piping

- The diameters of the system piping must be chosen in order to obtain an average gas speed from 15 - 30 m/s [49.21 – 98.43 ft. s] and must never be smaller than the diameters of the blower openings, if the diameters are different, use a taper connector.
- The system piping should be properly aligned and supported to prevent stress on the blower openings.
- Connect the cooling ports to atmosphere by means of silenced piping.



**Warning:** Protect consistently the cooling port from the risk of cutting and trapping.

- Provide flexible joints and support the pipes near the nozzles.
- Isolate the pipes to avoid heating the environment as well as a precaution to accidental contact.
- The pipes must be thoroughly cleaned before connection, in case of vacuum operation install a dirt filter for the first 100 working hours and provide a vacuumeter to check the dirt filter.
- The gaskets must not interfere with the gas system.

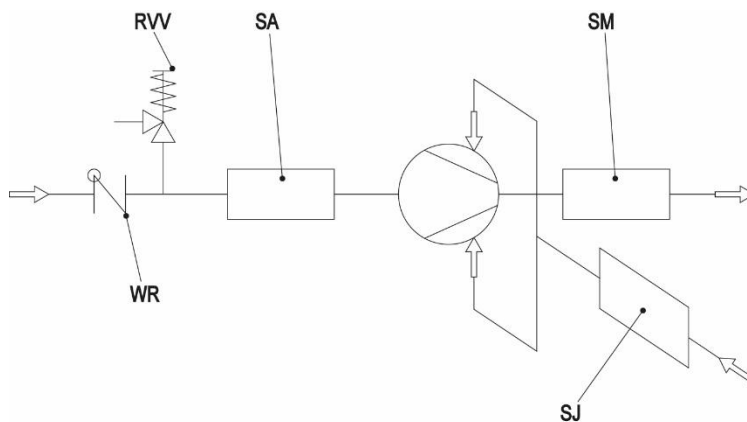
**Warning:** Remove the protective covers from the blower openings just before connection.

The recommended accessories are the following.

#### 4.5.1 Vacuum operation

This is the standard operation of the blower, the relief valve RVV is optional because the blower can operate with suction nozzle closed.

Pos.	Description
SA	Inlet silencer
SM	Discharge silencer
SJ	Injection silencer
RVV	Relief valve
WR	Check valve

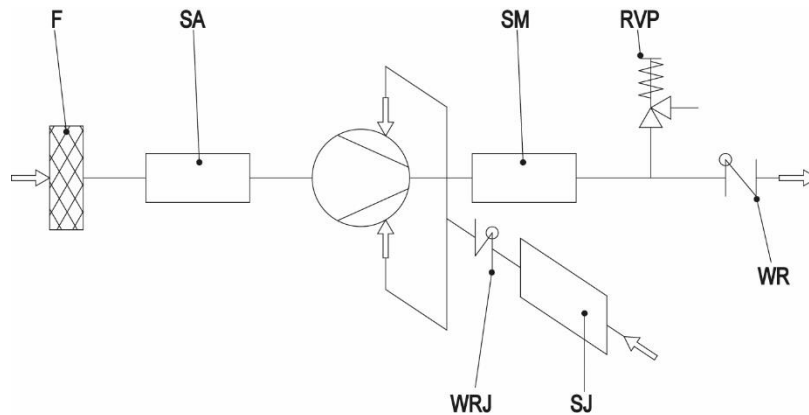


#### 4.5.2 Pressure operation

In this case insert a check valve WRJ in the injection pipe in order to prevent the back flow of outlet gas.

The operation in this condition must respect the performance limits of the corresponding blower RBS (see RB-7-100).

Pos.	Description
F	Filter
WR	Check valve
RVP	Relief valve
SPF	Inlet silencer
SM	Discharge silencer
SJ	Injection silencer
WRJ	Injection check valve



#### 4.5.3 Pressure / Vacuum operation

Pressure and Vacuum operation is not possible with this blower.



## 4.6 Cooling circuit (only for /RV)

Pos	Description
Rp	Pressure reducer
Vi	Shut-off valve
M	Pressure gauge
Vr	Adjusting valve
Fm	Flowmeter

Cooling water flow rate at 20 °C [68°F]		
Size	m³/h	CFM
85	0,15	0,088
125	0,30	0,176
145	0,45	0,265

Pressure max 6 mbar [87.02 psi]

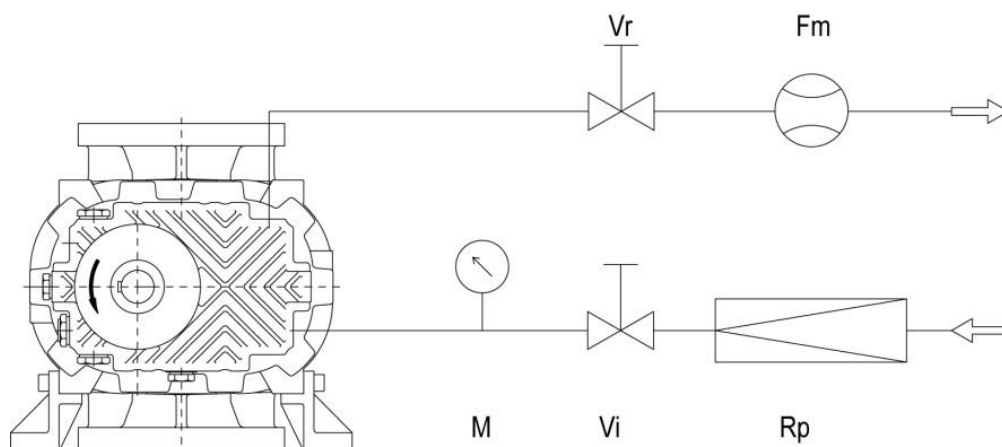


Figure 8

**Warning:** To avoid the danger of winter freezing use anti-freeze (any type used for car radiators).

## 4.7 Electric connection

- Electric connections must be set up by authorized specialists in compliance with regulations applying to the place of installation and in accordance with the requirements of the local body supplying electrical energy.

**Note:** Gardner Denver refuses all responsibility for electric connection not complying with the law in force.

- Check on the motor plate: Voltage, Absorbed current, Frequency, and Number of phases.
- Check the wiring diagram in the terminal board of the motor, if the diagram has not been supplied request it from the motor manufacturer.
- Use suitable electric cables depending on the nominal current of the electric motor.
- Keep the electric cables away from heat sources and/or pointed edges.
- Protect the motor by means of automatic switch set at the rated current shown on the motor plate.
- Install an emergency push button between supply line and the motor of the blower.

**Warning:** The operator must easily reach the emergency push-button.

- For the safety of personnel a suitable grounding device must protect the system.

**Warning:** Blower service must be carried out after disconnecting the electrical supply.

## 5. OPERATION


### 5.1 Preliminary controls

- If the blower has been in storage for more than 6 months, check its state of preservation.
- Check the alignment of the transmission and eventually the belt tension.
- Check that the blower rotate freely by hand.
- Check that the safety protection devices have been correctly installed and secured.
- Check that the pipes have been internally cleaned and if eventually obstructions have been removed.
- Check that all connections between pipes and blower are tightened and sealed.
- Fill the blower with oil as described in para 6.1.

### 5.2 First start up

 **Warning:** The personnel must wear the noise protection devices.

1. Open the shut-off valves on the piping.
2. Check that the relief valve has been set at the operating value.
3. Check the rotation direction using a short current pulse.

 **Warning:** Do not rotate the blower in the wrong direction for more than a few revolutions.

#### Start the blower

- Increase the operating pressure gradually until the rated value is reached.
- During the first **8** hours of operation check that there are no oil leakage and strange noises or vibrations, if such problems are found stop the blower immediately and contact our PV service.

### 5.3 Operation

Start the blower and check what enlisted in the table below.

CHECK	PARAMETER	FREQUENCY				NOTE
		H	G	S	M	
VISUAL	Pressure	-	1	-	-	Blower in operation
	Temperature	-	1	-	-	
	Absorbed power	-	1	-	-	
	Cooling liquid flow	-	1	-	-	
	Noise	-	1	-	-	
LUBRICATION	Oil level	500	-	-	-	Blower out of operation
	Oil Leakage	-	-	1	-	
	Viscosity	500	-	-	-	
	Oil change	4000	-	-	6	


CHECK	PARAMETER	FREQUENCY				NOTE
		H	G	S	M	
FILTER	Vacuum	-	1	-	-	< 35 mbar
	Clogging	-	-	-	2	
TRANSMISSION	Wear	2000	-	-	-	Blower out of operation
	Belt tension	2000	-	-	-	
	Belt change	15000	-	-	24	

H      operation hours      G      Days      S      weeks      M      months


 **Note:** In case of double indication follow the most limiting one for the application

## 5.4 Stopping the blower

- Remove, if possible, the differential pressure.

 **Note:** The blower can also be stopped in the presence of the counter-pressure, but, because the high current absorption of the motor, problems with the electric circuit may occur.

- Stop electric supply.

 **Warning:** Check that the deceleration of the blower is even and without vibrations.

## 6. MAINTENANCE

Stop the blower and auxiliary system as indicated in the para 5.4.

**Warning** Disconnect the electric supply, lock the general switching open position with the key and conserve it during service operation.

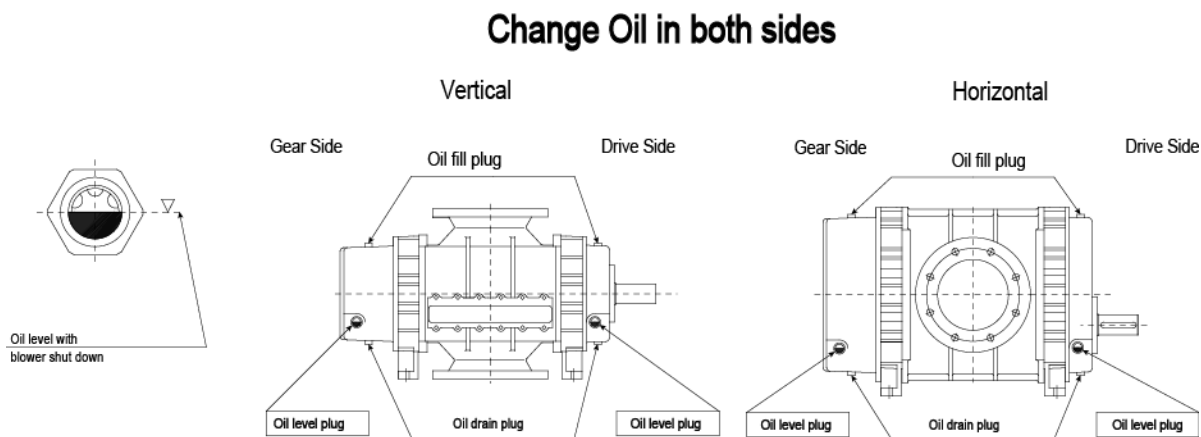
**Warning** Insulate the blower from the plant and restore the atmospheric pressure into it.

**Warning** The gas contained in the plant may be hot, toxic and irritant.

**Warning** Wait until the blower returns at ambient temperature (<40 °C [104 °F]).

### 6.1 Oil change

The first oil change is performed after 500 working hours, further changes as per table in the para 5.3.



Size	Oil quantity ( lt ) [gal] for /F /SP /V /RV			Oil quantity ( lt ) [Gal] for /H		
	Gear side	Drive side	Total	Gear side	Drive side	Total
45	0,75 [0.198]	0,40 [0.106]	1,15 [0.304]	0,45 [0.119]	0,25 [0.066]	0,70 [0.185]
65	1,20 [0.317]	0,60 [0.159]	1,80 [0.476]	0,60 [0.159]	0,30 [0.079]	0,90 [0.238]
85	2,00 [0.528]	0,90 [0.238]	2,90 [0.766]	0,90 [0.238]	0,40 [0.106]	1,30 [0.343]
105	3,50 [0.925]	1,60 [0.423]	5,10 [1.347]	1,60 [0.423]	0,80 [0.211]	2,40 [0.634]
125	4,80 [1.268]	2,80 [0.740]	7,60 [2.008]	3,10 [0.819]	1,80 [0.476]	4,90 [1.294]
145	10,50 [2.774]	6,00 [1.585]	16,50 [4.359]	6,00 [1.585]	3,50 [0.925]	9,50 [2.510]

**Warning:** Dispose the used oil in accordance with local regulations.

### 6.1.1 Oil type and viscosity

Mineral oil for general use, mineral oil for hydrostatic and hydrodynamic circuits, mineral oil for internal combustion engines or polialfaolefine base synthetic oil.

 **Warning:** Dispose the used oil in accordance with local regulations.

Oil type	Viscosity	Use			
		T ambient	T2	Toil	Note
Mineral	100	< 0 [32]	< 90 [194]	< 50 [122]	Check the poor point
Mineral	150	< 35 [95]	< 110 [230]	< 80 [176]	-
Mineral	220	< 50 [122]	< 130 [266]	< 110 [230]	Installation in soundproof enclosure
Synthetic	220	> 50 [122]	> 130 [266]	> 110 [230]	-

### 6.1.2 Recommended mineral oils

Make	Type	ISO VG - 150	Poor point	ISO VG - 220	Poor point
AGIP	RADULA	150	-20 [-4.0]	220	-18 [-0.4]
BP	ENERGOL	CS 150	-12 [10.4]	CS 220	-12 [10.4]
ESSO	NUTO	150	-18 [-0.4]	220	-18 [-0.4]
MOBIL	D.T.E.	EXTRAHEAVY	-9 [15.8]	BB	-7 [19.4]
SHELL	TELLUS	C 150	-18 [-0.4]	C 220	-15 [5.0]

## 6.2 Replacing the Shaft Seal

1. For the identification of parts see the drawings at pages 25 and 31.
2. Disassemble the drive.
3. Empty the lubricating oil out of the sump 12A.


 **Warning:** Dispose the used oil in accordance with local regulations.

4. Disassemble the sump 12A.
5. Clean the housing of any residues and/or deposits.
6. Replace the seal ring pos. 43A.
7. Reassemble the sump 12A.
8. Refill the sump 12A with new lubricating oil as per para 6.1.2
9. Couple the motor as shown in para 4.4.1 and 4.4.2.

## 6.3 Cleaning of Compression Chamber

Clean the internal surface of the chamber and the surface of the rotors from any deposits and rust by using solvents and a scraper.

 **Warning:** Keep to prescribed safety rules when using solvents and wear protection glasses and safety gloves

 **Note:** Do not damage the internal surface of the chamber and the surface of the rotors surface when using the scraper.

## 6.4 Check of the Gear Clearance

1. For the identification of parts see the sections at pages 25 and 31.
2. Empty the lubricating oil out of the sump 12B.

 **Warning:** Dispose the used oil in accordance with local regulations.

3. Disassemble the gear sump 12B.
4. Measure the clearance between the gear teeth according to the attached table 264468. In order to do this secure one of the gears and rotate the other until there is no contact.
5. Reassemble the sump 12B.
6. Refill the sump 12B with new lubricating oil as shown in para 6.1.2.
7. Send the table 264468 filled out with measured clearances to GARDNER DENVER. (or any authorized distributor) for their review.

## 6.5 Check of the Rotors Clearance

1. Disassemble the inlet piping.
2. Insert gauges into the inlet opening to measure the clearance of the rotors in various positions, turning the drive shaft by hand according to the attached table 264468.

 **Warning:** During this operation pay attention to rotors, which can cause the squeezing of the finger and hands.

3. Reassemble the inlet piping together with the silencer if present.
4. Send the table filled out with measured clearance to GARDNER DENVER (or any authorized distributor) for their review.

## 6.6 Spare Parts


In the table below are indicated the recommended spare parts for normal use of the blower according to the forecast timing.

For the spare parts of the blower refer to the drawings at pages 25 and 31.

Pos.	Description	Operation			
		Start-up	2 year	5 year	10 year
11 A - B	Gears (couple)	-	-	-	1
16 A - B	Lubricating disc (couple)	-	-	-	1
20	Sealing chamber (set)	-	-	-	1
23 A - B - C	Oil splash disc (set)	-	2	4	8
25	Sealing spacers (set)	-	1	2	4
26	Nut (couple)	-	-	1	2
27 A	Nut (GD-DV 115 – 225)	-	-	1	2
31 - 32 - 33	Bearing (set)	-	-	1	2
37	Shaft sleeve	1	2	4	8
43	Seal ring	1	2	4	8
45	Flexible piston rings (set)	-	1	2	4
50	Gaskets (set)	1	2	4	8
63 - 63 A	Compensating ring (set)	-	1	2	4
75 - 76 - 77	Oil draining plugs (set)	1	2	4	8
78	Oil level plugs (set)	1	2	4	8


In case of order please quoting always type, serial number and year of construction of the blower (these elements are indicated in front page of this manual) and relevant position of spare part indicated in the table.

 **Warning:** Do not use non-original spare parts or accessories.

 **Note:** GARDNER DENVER will not be liable for any damage, breakdown, and injury deriving from the use of non-original spare parts or accessories.


## 6.7 Demolition of the Blower

In case of demolition of the blower verify the eventual presence of explosive, toxic or dangerous substances and dispose them in accordance with local regulations.




 **Warning:** Dispose the used oil in accordance with local regulations.

 **Warning:** Dispose the filter element in accordance with local regulations.

Demolish the blower in such a way to make impossible to use again GD-DV UNIT as complete unit, or to use again one or several parts of the blower.

 **Note:** Destroy the nameplate of the blower and any other document.

## 7. TROUBLESHOOTING

Operating problems	List of causes
The motor does not start up and there is no noise	1-3-4
The motor does not start up, but humming noise is heard	2-3-4-5-6-7
Automatic cut off just after start up	3-4-5-6-7
Inlet pressure different from the rated value	13-17
Outlet pressure different from the rated value  <b>Warning:</b> STOP THE BLOWER IMMEDIATELY.	14-17
Outlet temperature different from the rated value  <b>Warning:</b> STOP THE BLOWER IMMEDIATELY.	8-13-14-15-17-18
High absorbed power	3-5-6-7-9-13-14-17-20-23
Oil and/or liquid leakage	10-11-12-16-20
High oil temperature	13-14-15-16-17-18-19-21-22
Unusual noises and/or vibrations  <b>Warning:</b> STOP THE BLOWER IMMEDIATELY.	5-6-7-8-9-13-14-15-18-23

Pos	Cause	Solution	Ref.
1	At least 2 of electric connections have been cut off	Check the fuses, terminal boards and connection cables and if required replace them	4.7
2	1 electric connection has been cut off	See point 1.	4.7
3	Incorrect electric connection	Check electric system	4.7
4	Faulty motor	Check the electric motor	4.7
5	Rotors making contact	Stop the blower immediately and check the internal clearances of the rotors and of the gear	6.4 6.5
6	Scale deposits in the compression chamber	Clean the compression chamber and the rotors, balance the rotors if necessary	6.3
7	Intake of foreign particles	Remove the foreign particles, clean the compression chamber and check the clearances	6.3 6.3 6.4
8	Rotors are worn	Check the internal clearances	6.5
9	Bearing are worn	Replace the bearings	(1)
10	Gaskets are worn	Replace the gaskets	(1)

Pos	Cause	Solution	Ref.
11	Drive shaft seal is worn	Replace the seal	6.2
12	Oil level plugs are broken	Replace the oil levels	(1)
13	Inlet piping is clogged	Check piping and remove obstruction	4.5.1
14	Outlet piping is clogged	Check piping and remove obstruction	4.5.2
15	Injection piping is clogged	Check piping and remove obstruction	4.5.1
16	Speed of rotation different from rated value	Reset the rated value	(2)
17	Inlet temperature different from rated value	Reset the rated value	(2)
18	Oil level too high	Reset correct oil level	6.1
19	Oil too viscous	Use less viscous oil	6.1.1
20	Oil produces foam	Change the type of oil	6.1.1
21	Transmission not aligned	Check the alignment	4.4

- (1) To do this operation see service manual  
(2) Check the plant



## 8. DISASSEMBLY AND REASSEMBLY

- Disassembly the blower within the guarantee period results in the cancellation of the guarantee.
- Disassembly, repair work and reassembling of the blower must be carried out only by **qualified personnel** and with the aid of suitable equipment and relevant manual.
- This manual contains only the instructions for preventative maintenance.
- For any references to components see the drawings at pages 25 and 31.



**Note:** Guarantee does not cover damages caused by operations carried out incorrectly during disassembly and/or reassembling of the blower.

### 8.1 Disassembly



**Warning:** Before starting disassembly stop the blower by following the procedure described at para 6.

1. Disassemble the drive components (pulleys or coupling) following the manufacturer's instructions if there are locking devices or by means of an extractor if attached directly onto the shaft.



**Warning:** Do not hammer the shaft coupling or pulley.

2. Drain the lubricating oil from the sumps 12A and 12B.



**Warning:** Dispose the used oil in accordance with local regulations.

#### 8.1.1 Disassembly of drive side sump

- Remove the key 30.
- Loose the fixing screws and extract the sump 12A together with seal ring pos. 43.

#### 8.1.2 Disassembly of gear side sump

Loose the fixing screws and extract the sump 12B.

### 8.2 Reassembling

Before reassembling, thoroughly clean all components and lubricate with oil those components, which have to slide over each other.

#### 8.2.1 Reassembling of drive side sump

1. Mount the seal ring 43 onto sump 12A using special equipment in order to avoid damaging the lip of the seal.
2. Lubricate the lip of the seal and sliding housing on the shaft with grease.
3. Mount the sump 12A on the cover 5A with a new gasket 50 in between.



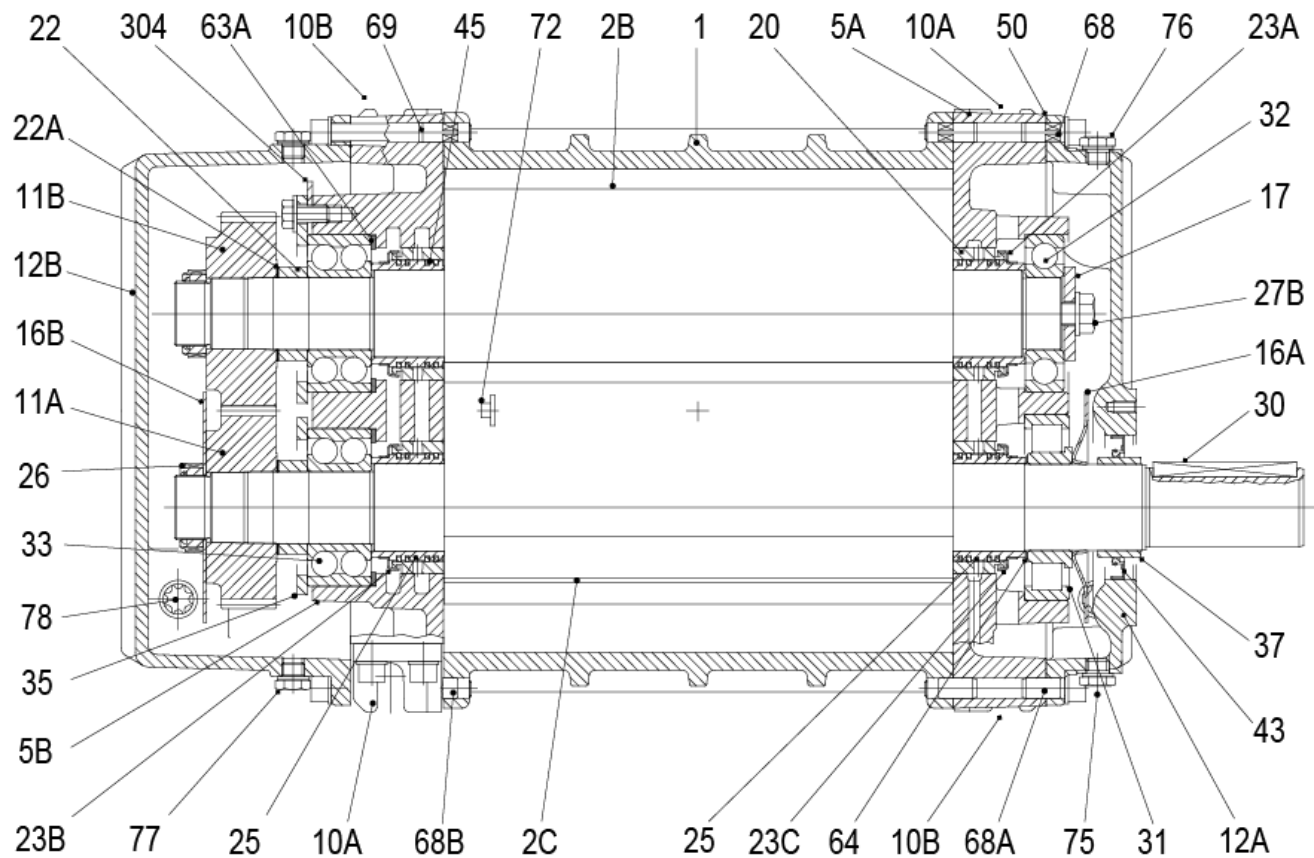
**Warning:** Do not damage the lip of the ring 43.

4. Secure the sump 12A with the relevant screws.

#### 8.2.2 Reassembling of gear side sump

- Mount the sump 12B onto cover 5B with a new gasket 50 in between.
- Secure the sump 12B with the relevant screws.

# GD-DV 45-65-85-105



## Part list (GD-DV 45-65-85-105)

Item	Description	Qty.	GD-DV 45	GD-DV 65	GD-DV 85	GD-DV 105
1	CASING	1	RB3255670301	RB3192950301	RB3192030301	RB3193660301
2B	ROTOR INTEGRAL SECONDARY	1	RB3202420305	RB3263040305	RB3181260305	RB3206510305
2C	ROTOR INTEGRAL PRIMARY	1	RB3202410305	RB3263030305	RB3181250305	RB3206520305
5A	COVER DRIVE SIDE	1	RB3202130301	RB3188600301	RB3188630301	RB3206440301
5B	COVER DRIVEN SIDE	1	RB3123660301	RB3188610301	RB3188640301	RB3206460301
10A	RIGHT FOOT	2	RB3152120300	RB3152140300	RB3152160300	RB3152180300
10B	LEFT FOOT	2	RB3152130300	RB3152150300	RB3152170300	RB3152190300
11A	DRIVING GEAR	1	RB3176720108	RB3182550108	RB3182570108	RB3206310108
11B	DRIVEN GEAR	1	RB3176730108	RB3182560108	RB3182580108	RB3206320108
12A	OIL SUMP DRIVE SIDE	1	RB3257390301	RB3198950301	RB3188590301	RB3206420301
12B	OIL SUMP DRIVEN SIDE	1	RB3098480301	RB3099840301	RB3110420301	RB3119630301
16A	LUBRICATING DISK - DRIVE	1	RB3199401203	RB3186521203	RB3183421203	RB3205951203
16B	LUBRICATING DISK - DRIVEN	1	RB3135821203	RB3182591203	RB3182601203	RB3206351203

Item	Description	Qty.	GD-DV 45	GD-DV 65	GD-DV 85	GD-DV 105
17	BEARING LOCK DISK	1	RB3050770109	RB3192730100	RB3182630109	RB3206360109
20	SEALING CHAMBER	4	RB3077670318	RB3077680318	RB3077690318	RB3205880318
22	GEAR SPACER	2	RB3135830157	RB3182640157	RB3182650157	RB3206340157
23A	OIL SPLASH DISK	1	RB3050791204	RB3051201204	RB3052241204	RB3205911204
23B	OIL SPLASH DISK	2	RB3050791204	RB3051201204	RB3052241204	RB3205911204
23C	OIL SPLASH DISK	1	RB3050791204	RB3051201204	RB3052241204	RB3205911204
25	SEALING SPACER	4	RB3202501252	RB3262480310	RB3182670310	RB3253100301
26	LOCK NUT	2	RB3005420125	RB1506000125	RB1937640125	RB1506300125
27B	SCREW	1	RB1524400116	RB1526900116	RB1524600116	RB1524600116
30	KEY	1	RB1529100124	RB1529300124	RB1529400124	RB1805490124
31	BEARING	1	RB2037240100	RB2035190100	RB2077920100	RB2077950100
32	BEARING	1	RB1503000100	RB1502400100	RB2032920100	RB1503200100
33	BEARING	2	RB1504200100	RB1504400100	RB2032930100	RB1505000100
35	BEARING COVER	2	RB3098000141	RB3183150141	RB3183160141	RB3206330141
37	INTERNAL RING	1	RB2038620100	RB2033490100	RB2033500100	RB3256110100
43	SEAL RING	1	RB1987640954	RB1978220954	RB2033510954	RB1891180954
45	FLEXIBLE RING	16	RB1516100308	RB1516200308	RB1516300308	RB3253090308
50	GASKET	2	RB1964741005	RB1978031005	RB1937601005	RB2200241005
63A	COMP. RING	6	RB1993790145	RB1993800145	RB2018270145	RB2309610145
64	COMP. RING	1	RB2038630145	RB2012570145	RB2033520145	RB2012330145
68	PIN	2	-	-	RB3140060124	RB3128490124
68A	PIN	2*	RB3098080124	RB3098080124	RB3140070124	RB3119740124
68B	PIN	1**	RB3098080124	RB3098080124	RB3140070124	RB3119740124
69	PIN	1	-	-	RB3140060124	-
72	PLUG	2	RB2035010901	RB1530000309	RB2035010901	RB2035010901
75	PLUG	1	RB2035010901	RB2035010901	-	-
76	PLUG	2	RB1518700901	RB1518700901	RB2011510901	RB2011510901
77	PLUG	4***	RB1519700901	RB1519800901	RB1519700901	RB1519800901
78	PLUG	4	RB2035391006	RB2035391006	RB1519301006	RB1519301006
304	ADJUSTMENT PLATE	4	RB3050860100	RB3050860100	RB3052820100	RB3052820100

\*FOR GD-DV 65, QTY. = 4

\*\*FOR GD-DV 65, QTY. = 2

\*\*\*FOR GD-DV 65, QTY. = 3

**Overhaul kit list**

## 1) GD-DV 45 Overhaul Kit - 301RBS6010

Item	Part Number	Part Description	Qty.
23A	RB3050791204	OIL SPLASH DISK	1
23B	RB3050791204	OIL SPLASH DISK	2
23C	RB3050791204	OIL SPLASH DISK	1
25	RB3202501252	SEALING SPACER	4
26	RB3005420125	LOCK NUT	2
31	RB2041610100	BEARING	1
32	RB1503000100	BEARING	1
33	RB2046180100	BEARING	2
37	RB2038620100	INTERNAL RING	1
43	RB1987640954	SEAL RING	1
45	RB1516100308	FLEXIBLE RING	16
50	RB1964741005	GASKET	2
63A	RB1993790145	COMP. RING	6
75	RB2035010901	PLUG	1
76	RB1518700901	PLUG	2
77	RB1519700901	PLUG	3

2) GD-DV 65 Overhaul Kit - 302RBS6010

Item	Part Number	Part Description	Qty.
23A	RB3051201204	OIL SPLASH DISK	1
23B	RB3051201204	OIL SPLASH DISK	2
23C	RB3051201204	OIL SPLASH DISK	1
25	RB3262480310	SEALING SPACER	4
26	RB1506000125	LOCK NUT	2
31	RB2035190100	BEARING	1
32	RB1502400100	BEARING	1
33	RB1504400100	BEARING	2
37	RB2033490100	INTERNAL RING	1
43	RB1978220954	SEAL RING	1
45	RB1516200308	FLEXIBLE RING	16
50	RB1978031005	GASKET	2
63A	RB1993800145	COMP. RING	6
75	RB2035010901	PLUG	2
76	RB1518700901	PLUG	2
77	RB1519800901	PLUG	2
78	RB2035391006	PLUG	4

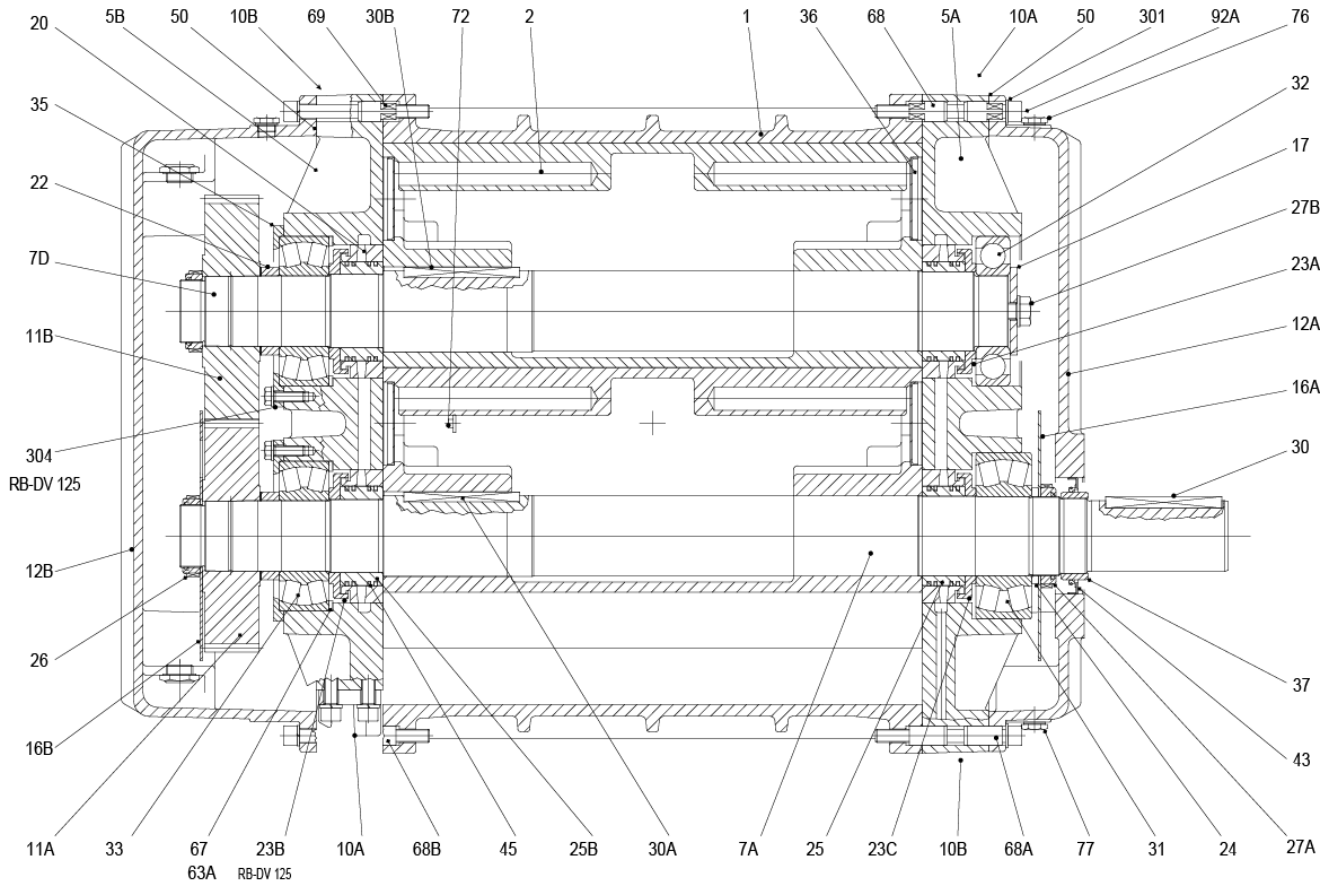
3) GD-DV 85 Overhaul Kit - 303RBS6010

Item	Part Number	Part Description	Qty.
23A	RB3052241204	OIL SPLASH DISK	1
23B	RB3052241204	OIL SPLASH DISK	2
23C	RB3052241204	OIL SPLASH DISK	1
25	RB3182670310	SEALING SPACER	4
26	RB1937640125	LOCK NUT	2
31	RB2077930100	BEARING	1
32	RB2032920100	BEARING	1
33	RB2032930100	BEARING	2
37	RB2033500100	INTERNAL RING	1
43	RB2033510954	SEAL RING	2
45	RB1516300308	FLEXIBLE RING	16
50	RB1937601005	GASKET	2
63A	RB2018270145	COMP. RING	6
76	RB2011510901	PLUG	2
77	RB2054010901	PLUG	2
77	RB1519700901	PLUG	2
78	RB1519301006	PLUG	4
79	RB2011300901	PLUG	2

4) GD-DV 105 Overhaul Kit - 304RBS6010

Item	Part Number	Part Description	Qty.
23A	RB3205911204	OIL SPLASH DISK	1
23B	RB3205911204	OIL SPLASH DISK	2
23C	RB3205911204	OIL SPLASH DISK	1
25	RB3253100301	SEALING SPACER	4
26	RB1506300125	LOCK NUT	2
31	RB2077950100	BEARING	1
32	RB1503200100	BEARING	1
33	RB1505000100	BEARING	2
37	RB3256110100	INTERNAL RING	1
43	RB1891180954	SEAL RING	2
45	RB3253090308	FLEXIBLE RING	16
50	RB2200241005	GASKET	2
63A	RB2309610145	COMP. RING	6
64	RB2012330145	COMP. RING	1
76	RB2011510901	PLUG	2
77	RB1519800901	PLUG	2
78	RB1519301006	PLUG	4
79	RB2011300901	PLUG	2

# GD-DV 125-145



## Part list (GD-DV 125-145)

Item	Description	Qty.	GD-DV 125	GD-DV 145
1	CASING	1	RB3199260301	RB3199280301
2	ROTOR	2	RB3185650305	RB3263040305
5A	COVER DRIVE SIDE	1	RB3186740301	RB3186770301
5B	COVER DRIVEN SIDE	1	RB3163020301	RB3186780301
7A	SHAFT PRIMARY	1	RB3185190107	RB3186310107
7D	SHAFT SECONDARY	1	RB3185200107	RB3186320107
10A	RIGHT FOOT	2	RB3163050301	RB3166360301
10B	LEFT FOOT	2	RB3163070301	RB3166380301
11A	DRIVING GEAR	1	RB3176800108	RB3186470108
11B	DRIVEN GEAR	1	RB3176810108	RB3186480108
12A	OIL SUMP DRIVE SIDE	1	RB3186750301	RB3166390301
12B	OIL SUMP DRIVEN SIDE	1	RB3185740301	RB3185770301
16A	LUBRICATING DISK - DRIVE	1	RB3186271203	RB2001781203
16B	LUBRICATING DISK - DRIVEN	1	RB1311101203	RB1403301203
17	BEARING LOCK DISK	1	RB3092870109	RB3135300109
20	SEALING CHAMBER	4	RB2000600318	RB3189300318



Item	Description	Qty.	GD-DV 125	GD-DV 145
22	GEAR SPACER	2	RB3126420157	RB3135290157
23A	OIL SPLASH DISK	1	RB3092861204	RB3198661204
23B	OIL SPLASH DISK	2	RB3092861204	RB3198661204
23C	OIL SPLASH DISK	1	RB3092861204	RB3198661204
25	SEALING SPACER	2	RB3250850301	RB3203150301
25B	SEALING SPACER	2	RB3250860301	RB3203160301
26	LOCK NUT	2	RB1507400125	RB1507000125
27A	LOCK NUT	1	RB1982930125	RB2034020125
27B	SCREW	1	RB1998670116	RB1998670116
30	KEY	1	RB1920210124	RB1501000124
30A	KEY	1	RB3119560124	RB3125250124
30B	KEY	1	RB3119560124	RB3125250124
31	BEARING	1	RB1830760100	RB1504000100
32	BEARING	1	RB1918970100	RB3005370100
33	BEARING	2	RB1504600100	RB1504700100
35	BEARING COVER	2	RB3126440301	RB3179310301
36	ROTOR CAP	12	RB3229821205	RB3150441205
37	INTERNAL RING	1	RB3256270100	RB3256280100
43	SEAL RING	1	RB1628200954	RB1498300954
45	FLEXIBLE RING	16	RB3250840308	RB1516600308
50	GASKET	2	RB2300261005	RB2300951005
63A	COMP. RING	8	RB2018570145	-
67	ADJUSTING RING	2	-	RB3186490100
68	PIN	2	RB3128490124	RB3125290124
68A	PIN	2	RB3119740124	RB3125240124
68B	PIN	1	RB3119740124	RB3125240124
69	PIN	1	RB3128490124	RB3125290124
72	PLUG	2	RB2035010901	RB2035010901
76	PLUG	2	RB1518900901	RB1518900901
77	PLUG	4	RB2054010901	RB2054010901
78	PLUG	4	RB1519401006	RB1519401006
304	ADJUSTMENT PLATE	6	RB3052820100	-

**Overhaul kit list**

## 1) GD-DV 125 Overhaul Kit - 305RBS6010

Item	Part Number	Part Description	Qty.
23A	RB3092861204	OIL SPLASH DISK	1
23B	RB3092861204	OIL SPLASH DISK	2
23C	RB3092861204	OIL SPLASH DISK	1
25	RB3250850301	SEALING SPACER	2
25B	RB3250860301	SEALING SPACER	2
26	RB1507400125	LOCK NUT	2
27A	RB1982930125	LOCK NUT	1
31	RB1830760100	BEARING	1
32	RB1918970100	BEARING	1
33	RB1504600100	BEARING	2
37	RB3256270100	INTERNAL RING	1
43	RB1628200954	SEAL RING	1
45	RB3250840308	FLEXIBLE RING	16
50	RB2300261005	GASKET	2
63A	RB2018570145	COMP. RING	8
76	RB1518900901	PLUG	2
77	RB1519800901	PLUG	4
78	RB1519401006	PLUG	4
79	RB2026730901	PLUG	2

2) GD-DV 145 Overhaul Kit - 306RBS6010

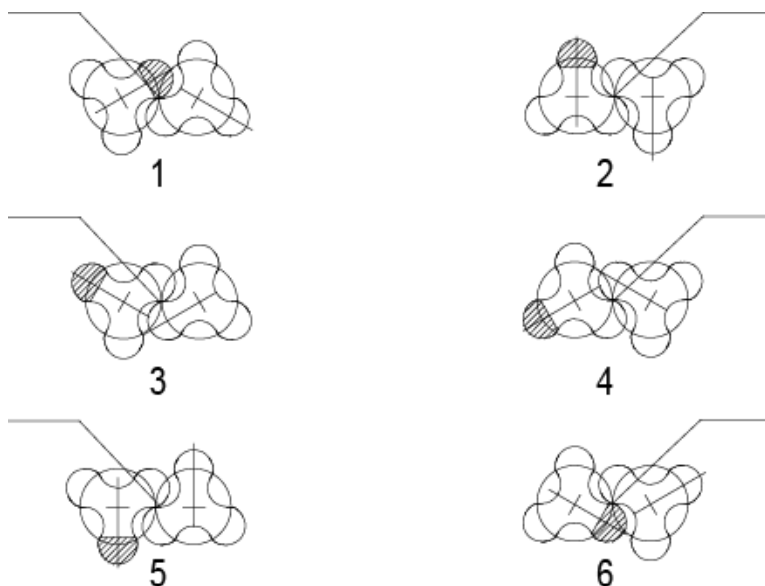
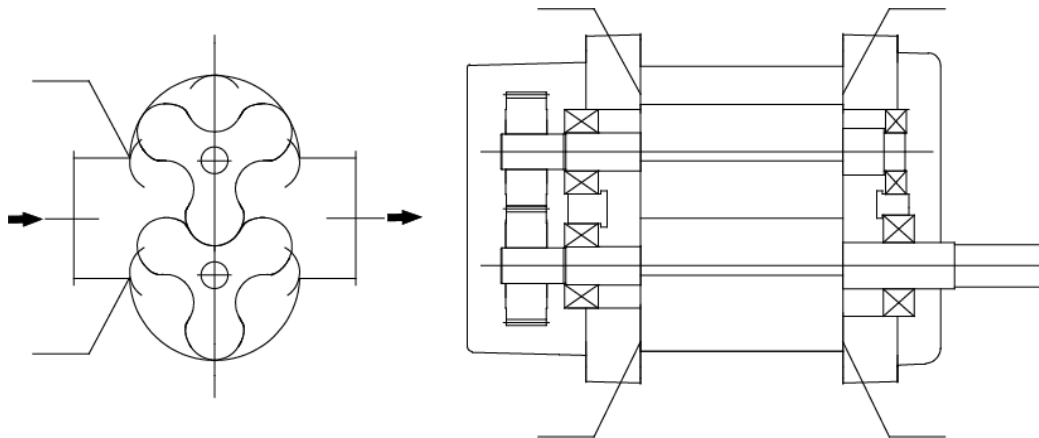
Item	Part Number	Part Description	Qty.
23A	RB3198661204	OIL SPLASH DISK	1
23B	RB3198661204	OIL SPLASH DISK	2
23C	RB3198661204	OIL SPLASH DISK	1
25	RB3203150301	SEALING SPACER	2
26	RB1507000125	LOCK NUT	2
27A	RB2034020125	LOCK NUT	1
31	RB1504000100	BEARING	1
32	RB3005370100	BEARING	1
33	RB1504700100	BEARING	2
37	RB3256280100	INTERNAL RING	1
43	RB1498300954	SEAL RING	1
45	RB1516600308	FLEXIBLE RING	16
50	RB2300951005	GASKET	2
76	RB1518900901	PLUG	2
77	RB1519800901	PLUG	4
78	RB1519401006	PLUG	4
79	RB2026730901	PLUG	2

Blower \_\_\_\_\_

Serial No. \_\_\_\_\_

Notes \_\_\_\_\_

Tolerances in 1/100 mm



Rotate drive shaft counterclockwise

Tolerances between gear sides \_\_\_\_\_

Bearing Tolerances		Drive Shaft	Driven Shaft
Radial	Driver side		
	Gear side		
Axial			
Date ____/____/____		Signature _____	



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