

RSV 151 / 301 / 601 RSV 151B / 301B / 601B

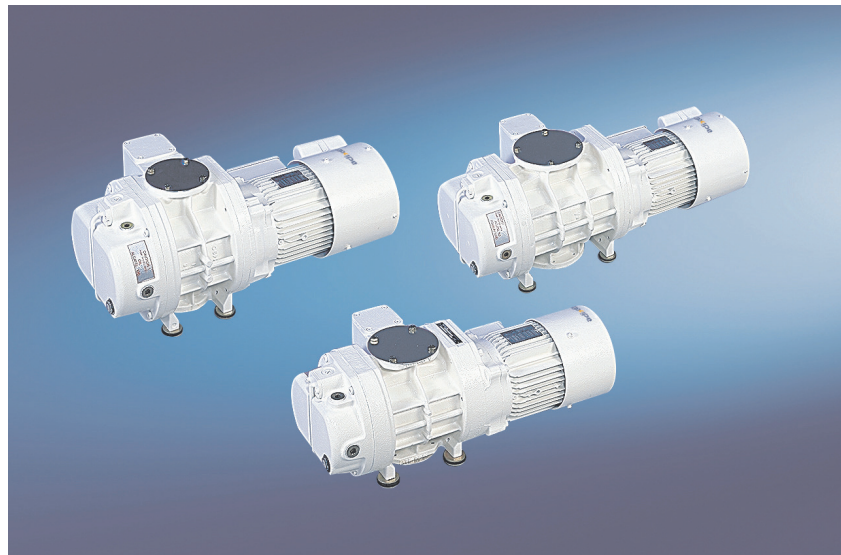


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**Manuel de l'Utilisateur
User's Manual
Benutzerhandbuch**

adixen

by Alcatel Vacuum Technology





Alcatel Vacuum Technology, as part of the Alcatel-Lucent Group, has been supplying vacuum pumps, helium and hydrogen leak detection systems, plasma sensors, vacuum measurement for several years.

Thanks to its complete range of products, the company has become an essential player in multiple applications : instrumentation, Research & Development, industry and semiconductors.

Alcatel Vacuum Technology has launched Adixen, its new brand name, in recognition of the company's international standing in vacuum position.

With both ISO 9001 and 14001 certifications, the French company is an acknowledged expert in service and support, and Adixen products have the highest quality and environmental standards.



With 45 years of experience, AVT today has a worldwide presence, through its international network that includes a whole host of experienced subsidiaries, distributors and agents.

The first step was the founding of Alcatel Vacuum Products (Hingham- MA) in the United States, thirty years ago, reinforced today by 2 others US subsidiaries in Fremont (CA) and Tempe (AZ).

In Europe, AVTF-France headquarters and its subsidiaries, Alcatel Hochvakuumtechnik (Germany), Alcatel Vacuum Technology UK (Scotland), Alcatel Vacuum Technology Benelux (Netherlands), Alcatel Vacuum Systems (Italy) and more recently Adixen Sensistor AB in Sweden (in 2007) form the foundation for the European partner network.

In Asia, our presence started in 1993 with Alcatel Vacuum Technology (Japan), and has been strengthened with Alcatel Vacuum Technology Korea (in 1995), Alcatel Vacuum Technology Taiwan (in 2001), Alcatel Vacuum Technology Singapore, Alcatel Vacuum Technology Shanghai (China) (in 2004).

This organization is rounded off by more than 40 representatives based in a variety of continents.

Thus, whatever the circumstances, the users of Adixen products can always rely on quick support of our specialists in Vacuum Technology.



INSTRUCTION MANUAL

RSV 151 - RSV 151 B
RSV 301 - RSV 301 B
RSV 601 - RSV 601 B

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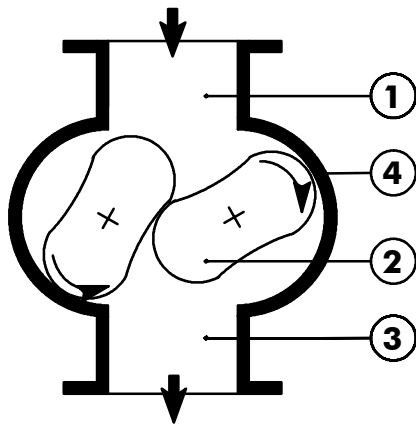
1. DESCRIPTION

1.1.GENERAL

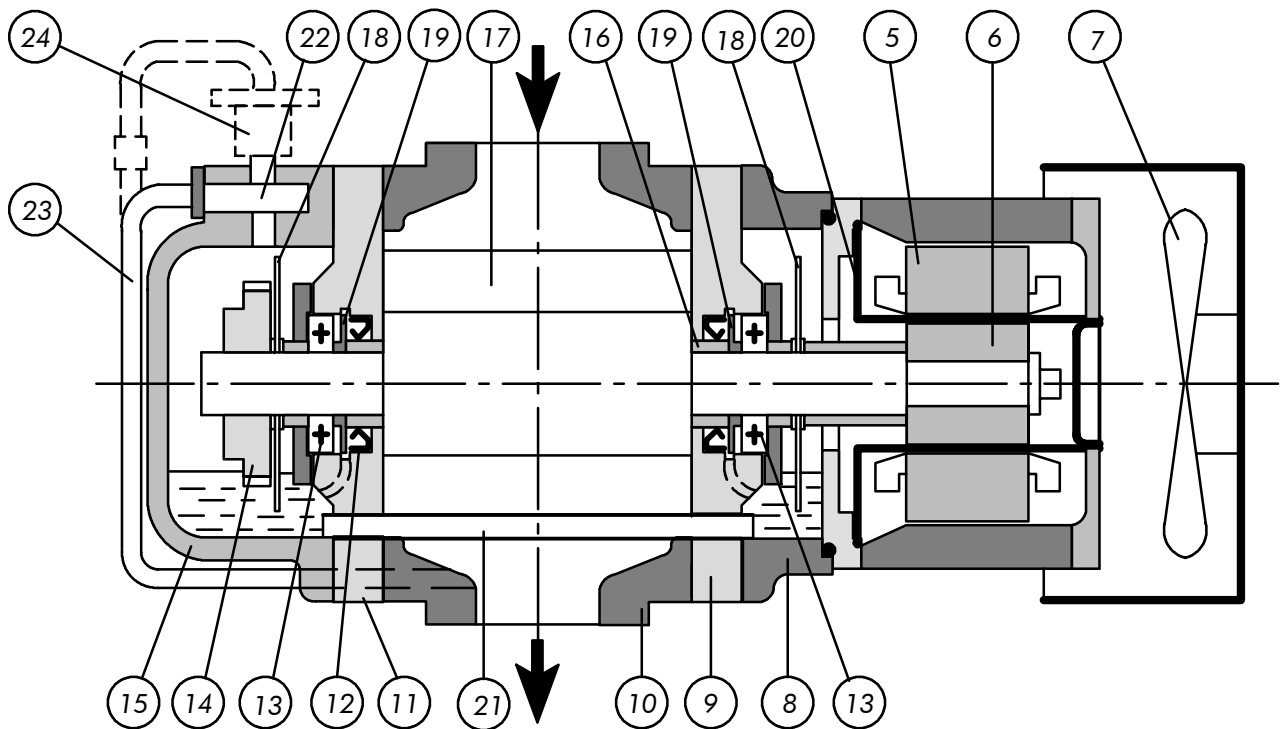
Roots vacuum boosters are positive displacement pumps operating according to an essentially isochoric compression cycle (constant volume transfer) with a high pumping rate in a pressure range between 10 and 10^{-2} mbar .

The pumping mechanism consists of two "figure-of-eight" pistons rotating in opposite directions and synchronised through a set of gears.

The two matched-profile pistons rotate without coming into contact with each other, with a clearance of about one tenth of mm.



- 1 - Inlet
- 2 - Piston
- 3 - Outlet
- 4 - Pump casing



- | | | |
|----------------|------------------------------|-----------------------------|
| 5-Motor stator | 12-Lip seal for dry friction | 19-Deflector |
| 6-Motor rotor | 13-Ball bearing | 20-Motor sleeve |
| 7-Fan | 14-Gear wheel | 21-Casing link tubes |
| 8-Casing | 15-Casing | 22-Filter |
| 9-End plate | 16-Friction ring | 23-Casing pump tubes |
| 10-Stator | 17-Piston | 24-Filter (for ADS version) |
| 11-End plate | 18-Splash | |

The lubrication requirements of these machines are limited to the ball bearings and synchronisation gear train. The two casings containing the oil are isolated from the pumping chamber by a sealing system (lip seal for dry friction in PTFE + treated friction ring + deflectors) which prevents any possibility of oil contamination of the pumped gases. Roots vacuum boosters operate in conjunction with a roughing pump (RP) which enables the gas flow to be delivered against atmospheric pressure.

Consequently, the pumping speed/pressure relation is directly related to the performance characteristics of the associated roughing pump.

The power consumption of the Roots machine is according to :

- the pumping speed,
- the rotation speed,
- the pressure difference between inlet and outlet sides.

1.2.PARTICULAR FEATURES OF THE RSV MACHINES

The most noteworthy feature of these machines is the motor coupling which is made only with static parts.

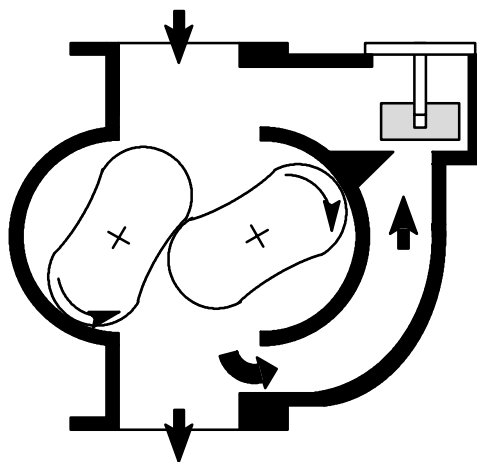
The roots RSV units are called "in vacuum rotor" machines, i.e., the rotor of the electric motor is completely isolated by a stainless steel cylindrical sleeve. This sleeve is centred inside the motor stator and attached to the machine casing, with a static o-ring providing the necessary seal. In this way, any possibility of leaks around the motor/pump coupling is precluded by eliminating the shaft passage with dynamic seal used in conventional set-ups.

The oil casings are sealed from the pumping chamber by means of a link tube connecting the casings to the outlet of the machine. This avoids the creation of any pressure difference between the pumping chamber and the casing which would otherwise be conducive to oil migration. An oil mist filter avoids any oil back-streaming into casing tubes.

1.3.PARTICULAR FEATURES OF THE RSV 151 B, RSV 301 B, RSV 601 B MACHINES

Machines with built-in by-pass valve. This valve provides a means of direct communication between the delivery outlet and suction inlet when the maximum permissible differential pressure is exceeded

In such an event, part of the gas flow is recycled, there by avoiding any overload on the electric motor.



This device enables the Roots booster and the roughing pump to be started up simultaneously from atmospheric pressure without the need of pressure switches for delaying start-up of the roots machine. A higher flow rate is thus obtained in high-pressure ranges, with a resulting reduction in pumping time.

Note : Machines with built-in by-pass valve can operate only with vertical pumping axis arrangement (valve operation under gravity).

1.4.PARTICULAR FEATURES OF THE RSV 151, 301, 601, ADS VERSION

The filter (24) is used to operate with a dry roughing pump. See the corresponding manual.

2. CHARACTERISTICS

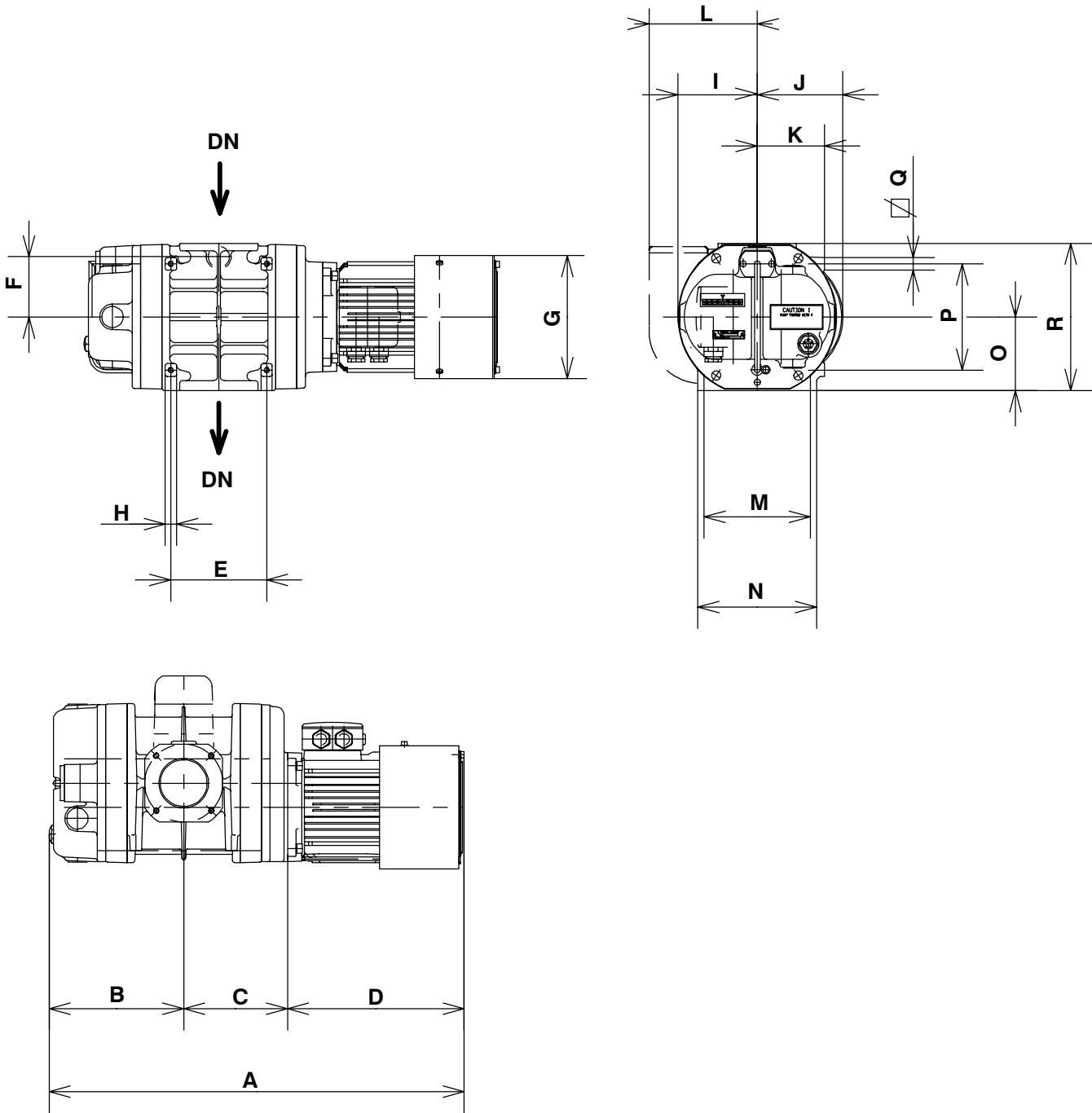
	UNITY	RSV 151	RSV 151B	RSV 301	RSV 301B	RSV 601	RSV 601B
▶ Pumping speed at 3000 rpm	m^3/h	150	150	300	300	600	600
▶ Maximum pumping at 50 Hz at 3000 rpm	m^3/h	120 (33)	120 (33)	240 (33)	240 (33)	420 (63)	420 (63)
▶ Maximum pumping at 60 Hz at 3600 rpm (Whith 2 stage RP of pumping speed)		145 (33)	145 (33)	290 (33)	290 (33)	500 (63)	500 (63)
▶ Rotating speed 50 Hz	tr/mn	3000	3000	3000	3000	3000	3000
▶ Rotating speed 60 Hz	tr/mn	3600	3600	3600	3600	3600	3600
▶ Total limit pressure	$mbar (1)$	$2 \cdot 10^{-4}$	$2 \cdot 10^{-4}$	$2 \cdot 10^{-4}$	$2 \cdot 10^{-4}$	$2 \cdot 10^{-4}$	$2 \cdot 10^{-4}$
▶ Partial limit pressure	$mbar (1)$	$5 \cdot 10^{-5}$	$5 \cdot 10^{-5}$	$5 \cdot 10^{-5}$	$5 \cdot 10^{-5}$	$5 \cdot 10^{-5}$	$5 \cdot 10^{-5}$
▶ Maxi. permissible differential pressure (Δp maxi.)	$mbar (2)$	100		60		40	
▶ Maximale pressure at suction inlet	$mbar$	30	1000	15	1000	10	1000
▶ Leak rate	$mbar.l/s$	$\leq 10^{-7}$	$\leq 10^{-7}$	$\leq 10^{-7}$	$\leq 10^{-7}$	$\leq 10^{-7}$	$\leq 10^{-7}$
▶ Intake flange	<i>Pneurop</i>	DN63	DN63	DN63	DN63	DN100	DN100
▶ Delivery flange	<i>Pneurop</i>	DN63	DN63	DN63	DN63	DN100	DN100
▶ Motor power 50 Hz	kW	0,75	0,75	1,5	1,5	1,8	1,8
▶ Motor power 60 Hz	kW	0,90	0,90	1,7	1,7	2,1	2,1
▶ Supply voltage 50 Hz Δ (+6% -10%)	V	200/240	200/240	200/240	200/240	200/240	200/240
▶ Supply voltage 50 Hz Y (+6% -10%)	V	380/415	380/415	380/415	380/415	380/415	380/415
▶ Supply voltage 60 Hz Δ (+6% -10%)	V	200/240	200/240	200/240	200/240	200/240	200/240
▶ Supply voltage 60 Hz Y (+6% -10%)	V	380/480	380/480	380/480	380/480	380/480	380/480
▶ Oil capacity (vertical axis)	l	0,4	0,4	0,7	0,7	0,7	0,7
▶ Oil capacity (horizontal axis)	l	0,3		0,5		0,5	
▶ Weight	kg	58	61	84	88	102	107
▶ Roots part number for ALCATEL 100 use ALCATEL 113 use		793270 793271	793272 793273	793274 793275	793276 793277	793278 793279	793280 793281

(1) measured with ALCATEL 113 oil and 2 stage roughing pump (RP)

(2) for machines with by-pass valve, pressures are controlled by the valve.

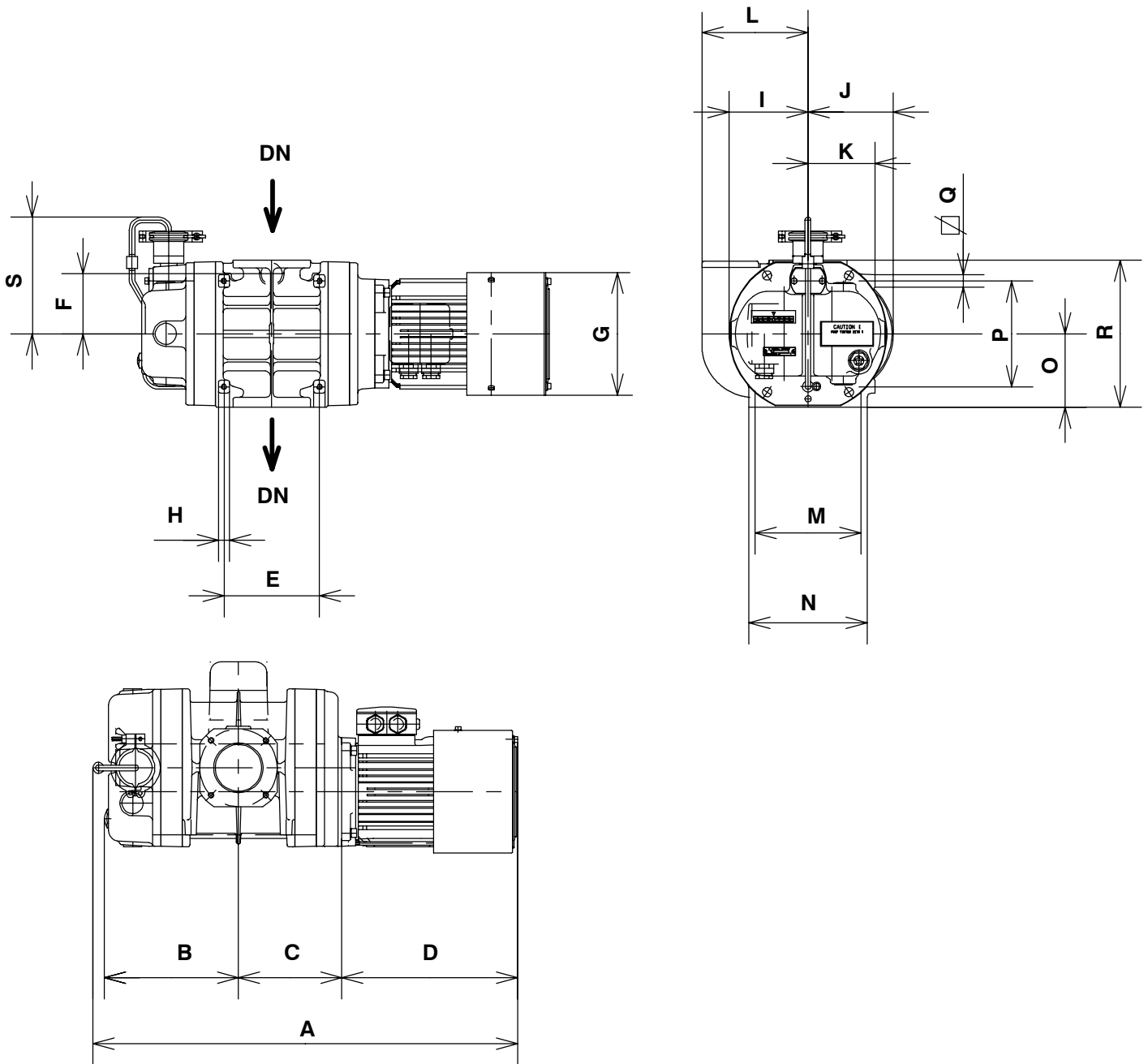
3. OVERALL DIMENSIONS

3.1. Standard ROOTS RSV pump (with or without by-pass)



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	DN
RSV151	586	190	147	249	135	85	174	16	115	121	95	150	150	168	104	150	16	208	63
RSV301	643	193	140	310	120	122,5	211	24	145	148	125	183	180	204	140	180	24	280	63
RSV601	743	243	190	310	220	122,5	211	25	145	148	125	183	180	204	140	180	24	280	100

3.2. ROOTS RSV pump (with by-pass for ADS version)



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	DN
RSV151	602	190	147	249	135	85	174	16	115	121	95	150	150	168	104	150	16	208	165,5	63
RSV301	643	193	140	310	120	122,5	211	24	145	148	125	183	180	204	140	180	24	280	196,5	63
RSV601	743	243	190	310	220	122,5	211	24	145	148	125	183	180	204	140	180	24	280	196,5	100

4. INSTALLATION - START-UP

4.1. INSTALLATION

⇒The machine must be handled by means of the two lifting rings on the intake flange.

⇒When fastening to a support frame chassis, use the threaded holes on the two side faces of the stator. All necessary precautions must be taken during tightening of fastening bolts to ensure that the stator is not subjected to any deformation.

⇒Remember to remove the desiccant bag from the pumping chamber.

⇒Machines without by-pass valve can be operated with either vertical or horizontal pumping axis ; **those equipped with such a valve can be operated only in the vertical axis position.**

⇒**For the machines without by-pass valve, operating with horizontal pumping axis, the plugs (125) must be removed to permit the oil circulation in the rear casing (4) (see general drawing at the end of the manual).**

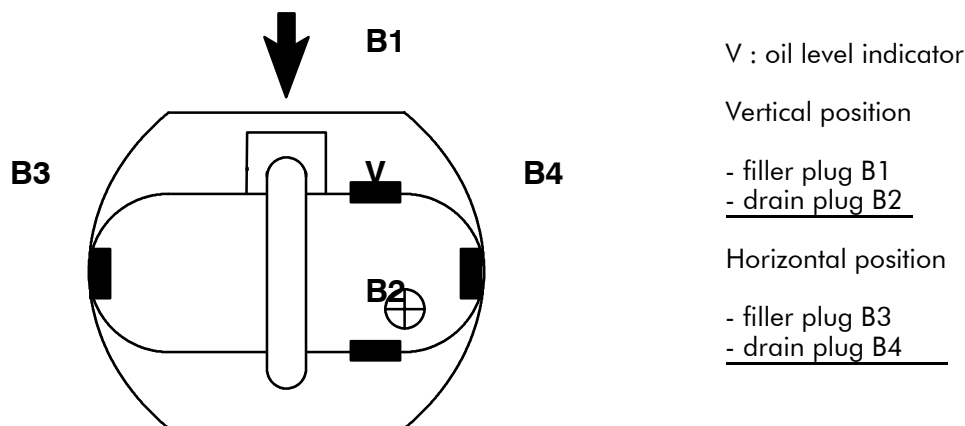
⇒Procedure

- Remove the 4 screws (102) of the rear casing (4), using a 6mm hexagonal socket wrench.
- Remove the rear casing (4).
- Remove the 2 plugs (125), using a 2mm hexagonal socket wrench.
- Reassemble the rear casing, and control the presence of the o-ring (201).

4.2. OIL FILLING

Note : Pumps contains no oil when delivered: oil is shipped in separate containers (see paragraph 5.1) For the machines without by-pass valve, operating with horizontal pumping axis, the plugs (125) sealing oil circulation would have been removed. (see paragraph 4.1).

The filler/drain plugs and oil level indicator are located on the same casing (gear side); the two casings are interconnected by pipe, thereby allowing simultaneous filling/draining of both casings.



Fill the oil casing with the recommended oil charge (see table page 18). Don't exceed this quantity.

On filling, wait for a few minutes to allow the oil to run along the inside walls before checking the level.

The oil level should be in the middle of the indicator ± 2 mm.

The plugs must be carefully tightened to avoid any leakage into casings under vacuum.

4.3.CONNECTION OF MOTOR

The machine is driven by a three-phase, asynchronous motor. The motor must be wired up according to the instructions given on the label inside the terminal box to the motor.

The motor piston must rotate anticlockwise when looking from the motor side.

The motor are fitted with a protective probe in the windings. This probe can be used to protect the motor from accidental overload.

For this purpose, the terminals must be connected to a device which cuts off the power supply to the motor.

The fan is powered with 220 V (50/60 Hz).

4.4.START-UP

⇒Machines equipped with a by-pass valve can be started up at the same time as the primary pump. At high pressure, the valve lifts up in order to restrict the differential pressure between intake and outlet to a certain threshold.

⇒Machines not fitted with by-pass valve can not be started up until the roughing pump has brought the chamber pressure down to the permissible start-up pressure.

This pressure will depend on the flow rate ratio between the roughing pump and the Roots vacuum booster and the maximum permissible pressure difference ΔP .

For these machines, pressure switches must be used. These will be fitted in the G 1/2" threaded holes located on the intake flange. The pressure switches will enable the machine to be started up as soon as the pressure threshold is reached and also provide protection in the event of accidental pressure rise.

Pressure switch	Adjustment range (mbar)	Reference number		
		gauge	power unit	assembly kit
APS 3	1 à 20	786423	053177	060174
APS 4	35 à 200	786424	-	060174
APS 31	3 à 65	786435	053177	060173

5. STANDARD MAINTENANCE

5.1. OIL LEVEL

⇒ Oil levels must be periodically checked if the machine is used under continuous operating conditions. When clean gases are being pumped, the oil is subjected to normal mechanical wear only : in such case, oil renewal is recommended every 5000 hours.

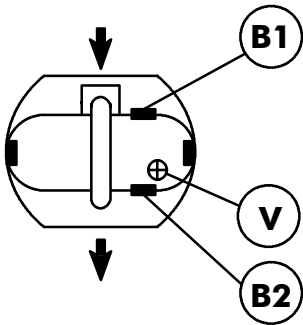
Procedure.

⇒ Shut down the Roots booster (and roughing pump) and vent the pumping chamber to atmospheric pressure.

Vertical position

Filler plug B1

Drain plug B2

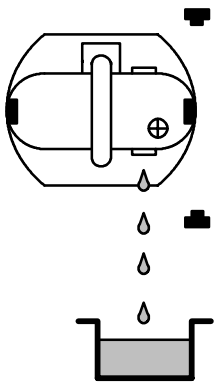
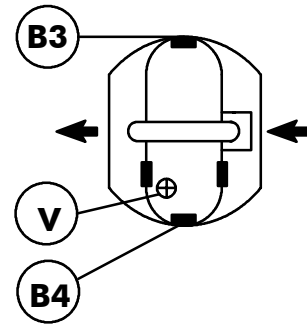


V : oil level indicator

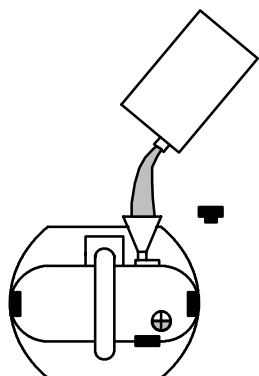
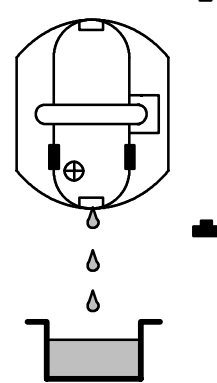
Horizontal position

Filler plug B3

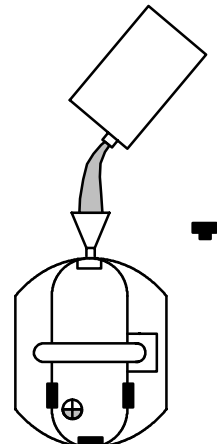
Drain plug B4



- Remove the filler plug.
- Remove the drain plug and leave the dirty oil to drain out.



- Screw back the drain plug.
- **Fill with the recommended fresh oil charge (see table page 18).** Wait for a few minutes to allow the oil to flow along the inside walls and motor casing link tube before checking the level indicator.
- Screw back the filler plug and secure it.
- The oil level should be in the middle of the indicator $\pm 2\text{mm}$.



⇒We recommend the use of ALCATEL oil.

ALCATEL 113 Synthetic oil - 0,5 liter - P/N **064657**

ALCATEL 113 Synthetic oil - 2,5 liters - P/N **064659**

For non-corrosive applications, the machine can be lubricated with ALCATEL 100 Type mineral oil ; in this case , one ALCATEL 100 oil charge is delivered with the machine ordered with mineral oil.

ALCATEL 100 - mineral oil - 1 liter - P/N **010990**

Be careful ! these 2 oil types are not compatible together. For any change consult ALCATEL factory.

5.2.CLEANING

⇒Under certain pumping conditions, deposits may form in the pumping chamber and on the pistons.

⇒These deposits can be removed by disconnecting the intake and delivery pipes, making sure that the motor can no longer be switched on.

A suitable solvent and metal brush may be used, turning the pistons by hand.

Once these cleaning operations have been completed, change the oil in the casings and check that the piston turn freely before switching the machine back on.

5.3.ROOTS MAINTENANCE

The wearing parts are easy to replace, requiring particular care and special tools as well as qualified operator. Before proceeding to any operation, consult Customer Service for information.

To replace these parts, ALCATEL recommends the spare parts kit, the tool kit available on request.

Spare parts kit for Roots RSV 301/301 B RSV 601/601 B **P/N. 051992**

Spare parts kit for Roots RSV 151/151 B **P/N. 051990**

Tool kit **P/N. 051940**

6. NOMENCLATURE - NOMENKLATUR

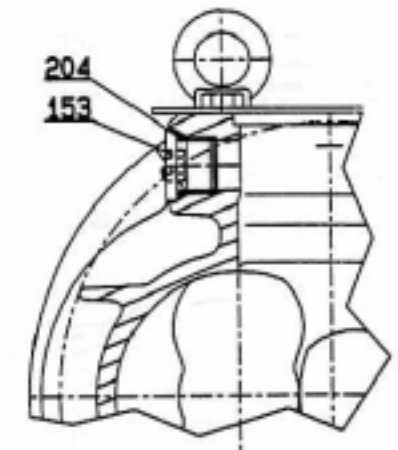
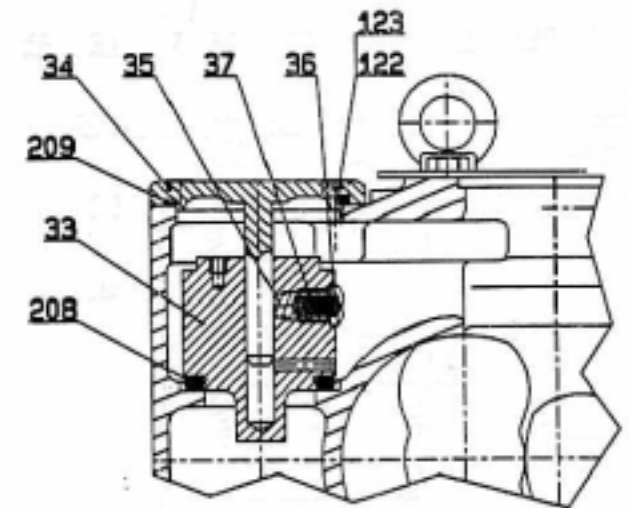
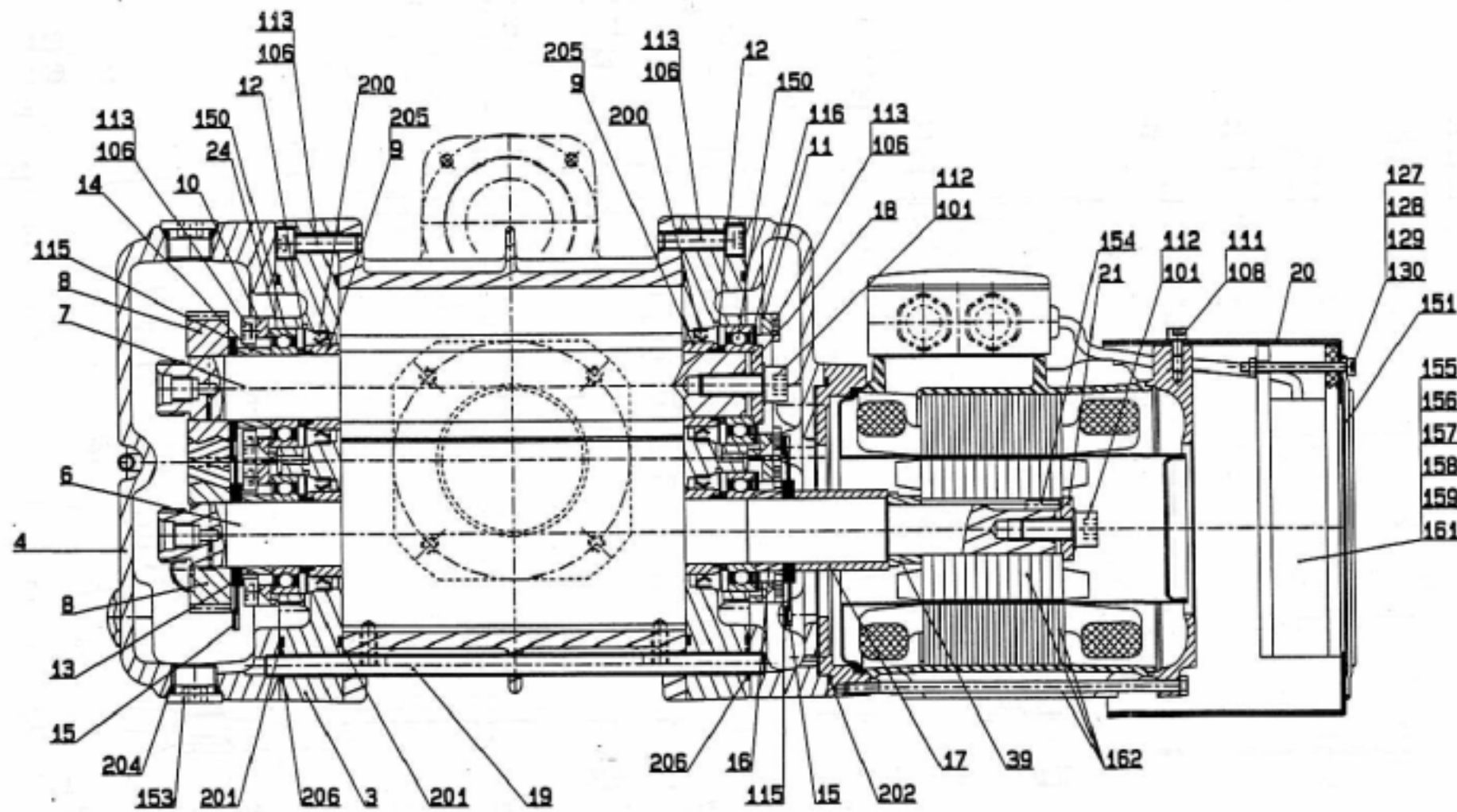
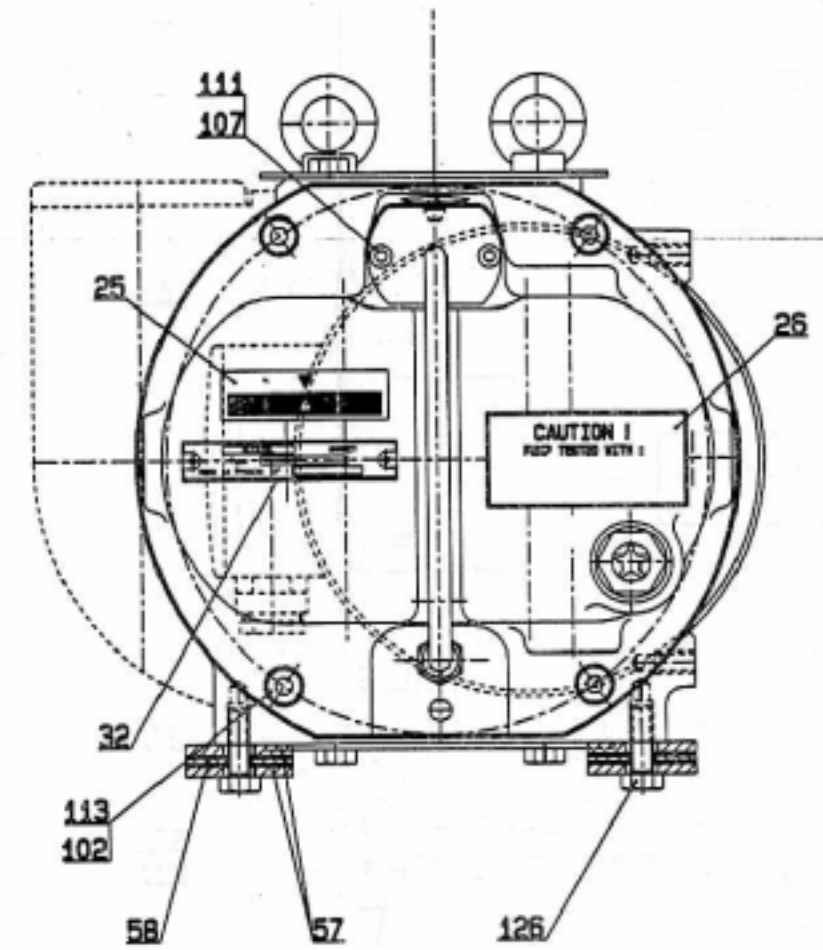
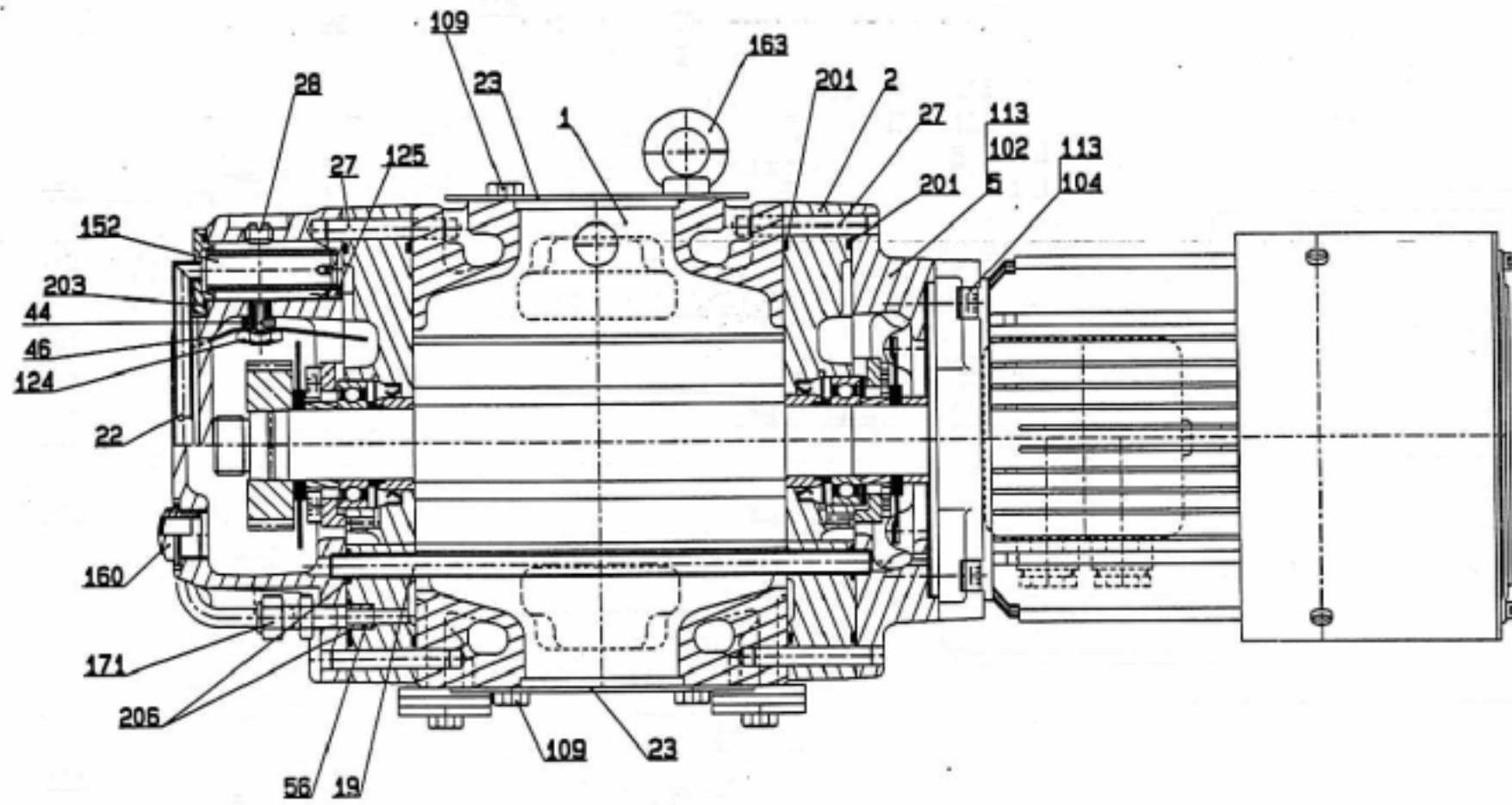
REP	DESIGNATION	SPECIFICATION	BENENNUNG	TYPES ROOTS					
				1 5 1	1 5 1 B	3 0 1	3 0 1 B	6 0 1	6 0 1 B
1	Stator	Stator	Stator	1	1	1	1	1	1
2	Flasque avant	Front plate	Vordere Seitenplatte	1	1	1	1	1	1
3	Flasque arrière	Rear plate	Hinteres Seitenplatte	1	1	1	1	1	1
4	Carter arrière	Rear casing	Hinteres Gehäuse	1	1	1	1	1	1
5	Carter avant	Front casing	Vorderesgehäuse	1	1	1	1	1	1
6	Piston menant	Driving piston	Führungskolben	1	1	1	1	1	1
7	Piston mené	Driven piston	Geführter Kolben	1	1	1	1	1	1
8	Jeu de roues appariées	Paired gear	Zahnrad	1	1	1	1	1	1
9	Bague de frottement	Friction ring	Reibungsring	4	4	4	4	4	4
10	Bride de roulement arrière	Rear bearing flange	Hinterer Lagerflansch	2	2	2	2	2	2
11	Bride de roulement avant	Front bearing flange	Vorderer Lagerflansch	2	2	2	2	2	2
12	Déflecteur	Deflector	Ablenkplatte	4	4	4	4	4	4
13	Bague inférieure	Lower ring	Unterer Ring	1	1	1	1	1	1
14	Bague supérieure	Upper ring	Oberer Ring	1	1	1	1	1	1
15	Disque de graissage	Lubricating ring	Spritzscheibe	2	2	2	2	2	2
16	Bague côté moteur	Ring on motor side	Motorseitiger Ring	1	1	1	1	1	1
17	Entretoise moteur	Motor spacer	Distanzstück Motor	1	1	1	1	1	1
18	Rondelle roulement avant	Washer for front bearing	Scheibe vord. Lager	1	1	1	1	1	1

REP	DESIGNATION	SPECIFICATION	BENENNUNG	TYPES ROOTS						
				1 5 1	1 5 1 B	3 0 1	3 0 1 B	6 0 1	6 0 1 B	
19	Tube de liaison carters	Oil connecting pipe	Verbindungsrohr	2	2	2	2	2	2	
20	Capot de ventilation	Fan cover	Lüfterhaube	1	1	1	1	1	1	
21	Rondelle	Washer	scheibe	1	1	1	1	1	1	
22	Tubulure	Pipe	Evakuierungsleitung	1	1	1	1	1	1	
23	Protecteur DN 63 Protecteur DN 100	NW 63 Cover plate NW 100 Cover plate	DN 63 Deckel DN 100 Deckel	2	2	2	2	2	2	
24	Câle de réglage	Adjustment shim	Distanzscheibe	10	10	10	10	10	10	★
27	Goupille Ø 8	Pin	Zylinderstift	4	4	4	4	4	4	
28	Bouchon	Plug	Stopfen	1	1	1	1	1	1	
33	Clapet de by-pass	By-pass valve	Bypass Ventil		1		1		1	
34	Couvercle	Cover	Deckel		1		1		1	
35	Patin	Shoe	Gleitstock		1		1		1	★
36	Vis de réglage	Adjustment screw	Regelschraube		1		1		1	
37	Ressort	Spring	Feder		1		1		1	★
38	Entretoise ventilateur	Fan spacer	Distanzstück für Lüfter- haube			3	3	3	3	
39	Bague	Ring	Ring	1	1	1	1	1	1	
44	Goujon	Pin	Stift	1	1	1	1	1	1	
46	Défecteur	Deflector	Ablenkplatte	1	1	1	1	1	1	
56	Tube anti-extrusion	Safety tube	Rohr	1	1	1	1	1	1	
57	Rondelle pour amortis- seur	Washer for shock absorber	Scheibe für Swingme- tal	8	8	8	8	8	8	
58	Rondelle caoutchouc	Washer	Scheibe	4	4	4	4	4	4	
101	Vis CHc M10-25 Vis CHc M10-30	Screw Screw	Schraube Schraube	2	2	1	1	2	2	
102	Vis CHc M8-55 Vis CHc M8-40	Screw Screw	Schraube Schraube	8	8	8	8	8	8	

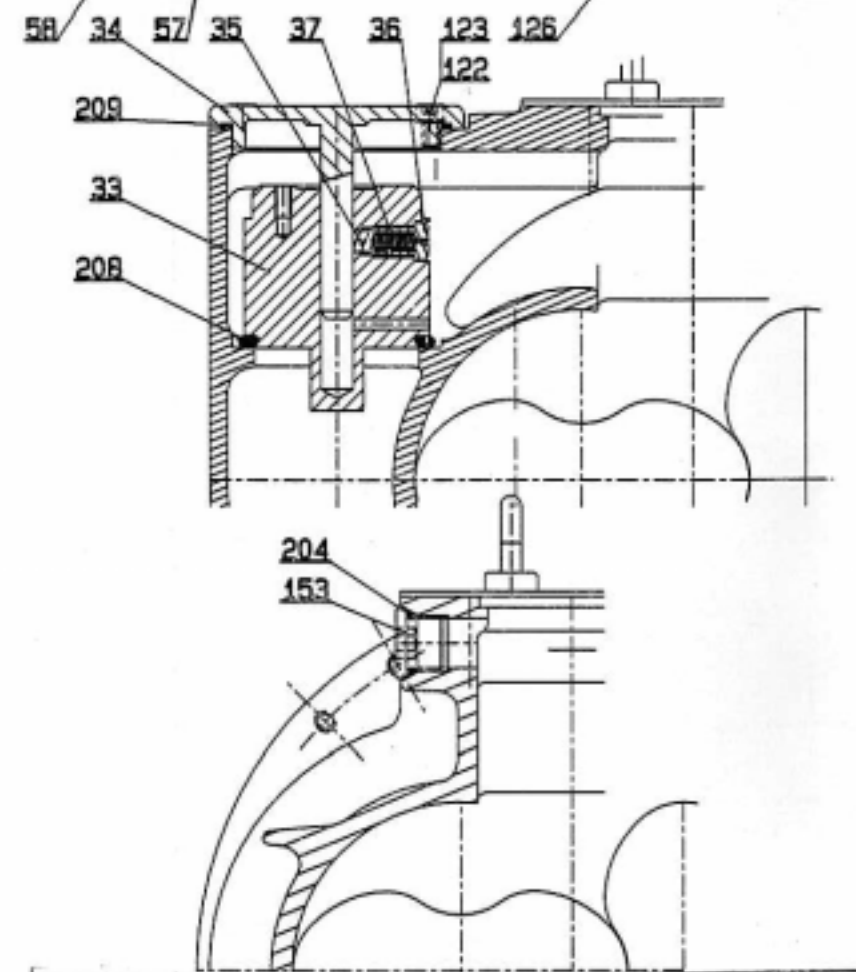
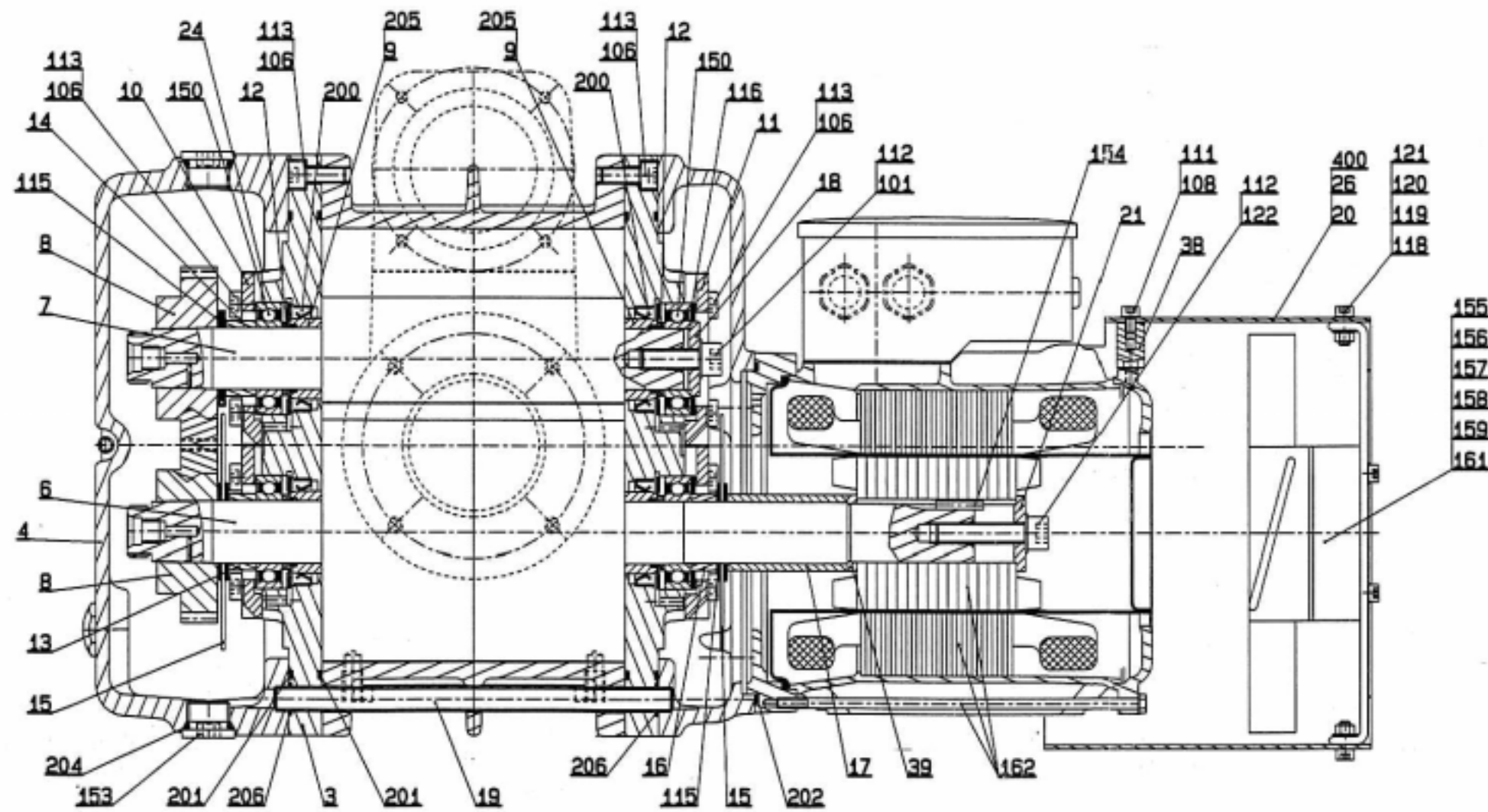
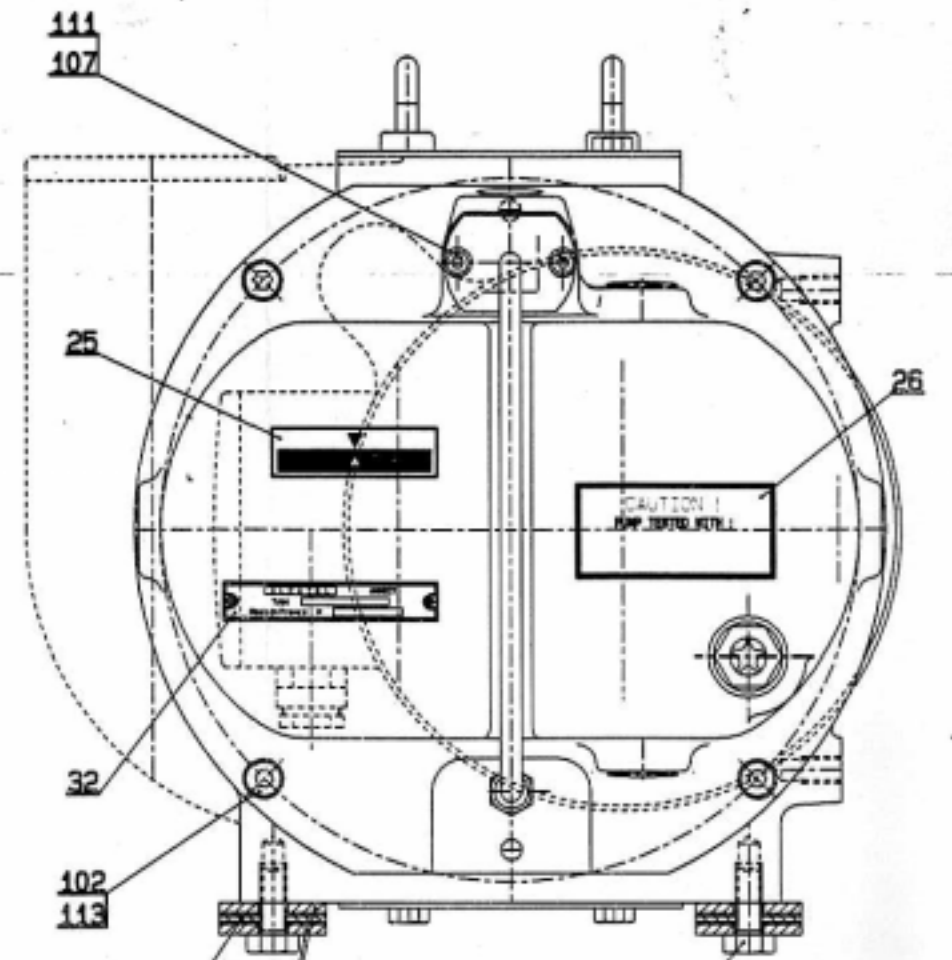
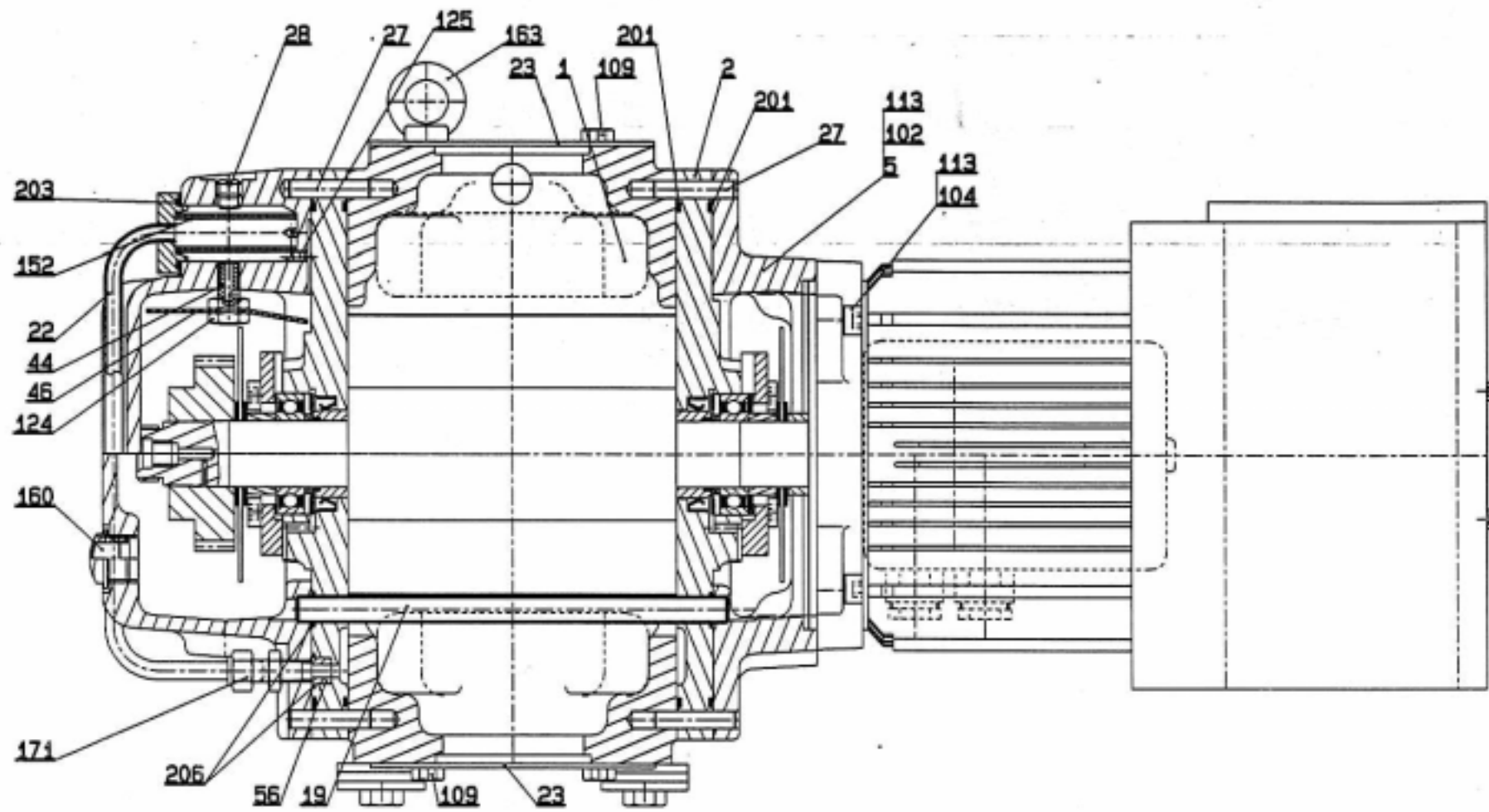
REP	DESIGNATION	SPECIFICATION	BENENNUNG	TYPES ROOTS						
				1 5 1	1 5 1 B	3 0 1	3 0 1 B	6 0 1	6 0 1 B	
103	Vis CHc M8 x 30	Screw	Schraube	4	4					
104	Vis CHc M8-25	Screw	Schraube	4	4	4	4	4	4	
106	Vis CHc M8-16	Screw	Schraube	8	8					
	Vis CHc M8-20	Screw	Schraube			12	12	12	12	
107	Vis CHc M5-12	Screw	Schraube	6	6	2	2	2	2	
108	Vis CHc M5-8	Screw	Schraube	4	4	3	3	3	3	
109	Vis H M8-10	Screw	Schraube	6	6	6	6	6	6	
110	Vis CBLZ M3 x 6	Screw	Schraube	1	1					
111	Rondelle	Washer	Unterlegscheibe	5	5	5	5	5	5	
112	Rondelle	Washer	Unterlegscheibe	2	2	2	2	2	2	★
113	Rondelle	Washer	Unterlegscheibe	24	24	24	24	24	24	★
114	Rondelle	Washer	Unterlegscheibe	1	1					
115	Rondelle	Washer	Unterlegscheibe	18	18	18	18	18	18	★
116	Rondelle	Washer	Unterlegscheibe	6	6	6	6	6	6	★
118	Vis CHc M4-16	Screw	Schraube			4	4	4	4	
119	Ecrou HM 4U	Screw nut	Mutter			4	4	4	4	
120	Rondelle Ø 4	Washer	Unterlegscheibe			4	4	4	4	
121	Rondelle	Washer	Unterlegscheibe			4	4	4	4	
122	Vis CHc M6-10	Screw	Schraube		4		4		4	
	Vis CHc M10-45					1				
123	Rondelle	Washer	Unterlegscheibe		4		4		4	
124	Ecrou HM 10	Screw nut	Mutter	1	1	1	1	1	1	
125	Vis Hc M4	Screw	Schraube	2	2	2	2	2	2	
126	Vis HM 8 x 25	Screw	Schraube	4	4					
	Vis HM 10 x 25	Screw	Schraube			4	4			
127	Vis CHc M4 x 50	Screw	Schraube	4	4					
128	Rondelle M4	Washer	Unterlegscheibe	4	4					
129	Ecrou HM 4	Nut	Mutter	4	4					
130	Rondelle	Washer	Unterlegscheibe	4	4					
150	Roulement à billes	Ball bearing	Kugellager	4	4	4	4	4	4	★
151	Grille de protection	Screening grid	Abschirmgitter	1	1					
152	Cartouche filtre	Oil filter	Filtreinsatz	1	1	1	1	1	1	★
153	Bouchon	Plug	Stopfen	5		5		5		
154	Aiguille Ø 4	Needle	Nadel	1	1					
	Aiguille Ø 4	Needle	Nadel			1	1	1	1	

REP	DESIGNATION	SPECIFICATION	BENENNUNG	TYPES ROOTS						
				1 5 1	1 5 1 B	3 0 1	3 0 1 B	6 0 1	6 0 1 B	
155	Câble	Cable	Kabel	-	-	-	-	-	-	
156	Cosse Ø 5	Lug	Kabelschuh	3	3	3	3	3	3	
157	Cosse Ø 3 Passe-fil	Lug Cable feed through sleeve	Kabelschuh Kugellager	1	1	2	2	2	2	
158	Gaine Barrette de connection	Sheath Connection bar	Mantel Anschlussleiste	-	-	-	-	-	-	
159	Gaine	Sheath	Mantel	-	-	-	-	-	-	
160	Voyant niveau d'huile	Oil level sight glass	Ölschauglas	1	1	1	1	1	1	★
161	Ventilateur	Fan	Ventilator	1	1	1	1	1	1	
162	Moteur 3PH sous vide	3 ø motor	Drehstrommotor	1	1	1	1	1	1	
163	Anneau de levage	Lifting ring	Ringschraube	2	2	2	2	2	2	
166	Collier ty-rap	Ty-rap collar	Stellring	1	1	1	1	1	1	
167	Connecteur embase	Connector	Verbinder	1	1	1	1	1	1	
168	Collier ty-rap	Ty-rap collar	Stellring			1	1	1	1	
171	Raccord tube	Pipe connecting part	Rohrverschraubung	1	1	1	1	1	1	
200	Joint à lèvres	Lip seal	Lippendichtung	4	4	4	4	4	4	☆
201	Joint torique Ø3x165	O-ring	O-Ring	4	4					☆
	Joint torique Ø3x218	O-ring	O-Ring			4	4	4	4	☆
202	Joint torique Ø3x134,5	O-ring	O-Ring	1	1					☆
	Joint torique Ø3x154,5	O-ring	O-Ring			1	1	1	1	☆
203	Joint torique Ø 3x24	O-ring	O-Ring	1	1	1	1	1	1	☆
204	Joint torique Ø 2,7x18,4	O-ring	O-Ring	5		5		5		☆
205	Joint torique Ø 2x30	O-ring	O-Ring	4	4	4	4	4	4	☆
206	Joint torique Ø 2,4x10,3	O-ring	O-Ring	5	5					☆
	Joint torique Ø 2x12	O-ring	O-Ring			5	5	5	5	☆
208	Joint tor. Ø 5,33x37,47	O-ring	O-Ring		1					☆
	Joint tor. Ø 5,33x56,52	O-ring	O-Ring				1		1	☆
209	Joint torique Ø 3x60	O-ring	O-Ring		1					☆
	Joint torique Ø 3x80	O-ring	O-Ring				1		1	☆
400	Vis CLS 3.5 M12	Screw	Schraube			2	2	2	2	

★ ☆ Element du lot de maintenance/ Part from the spare parts kit/ Teil aus dem Wartungssatz



ROOTS RSV 151/151 B
 PLAN D'ENSEMBLE/GENERAL DRAWING
 ÜBERSICHTPLAN



ROOTS RSV 301/301 B/601/601B
 PLAN D'ENSEMBLE/GENERAL DRAWING
 ÜBERSICHTPLAN

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