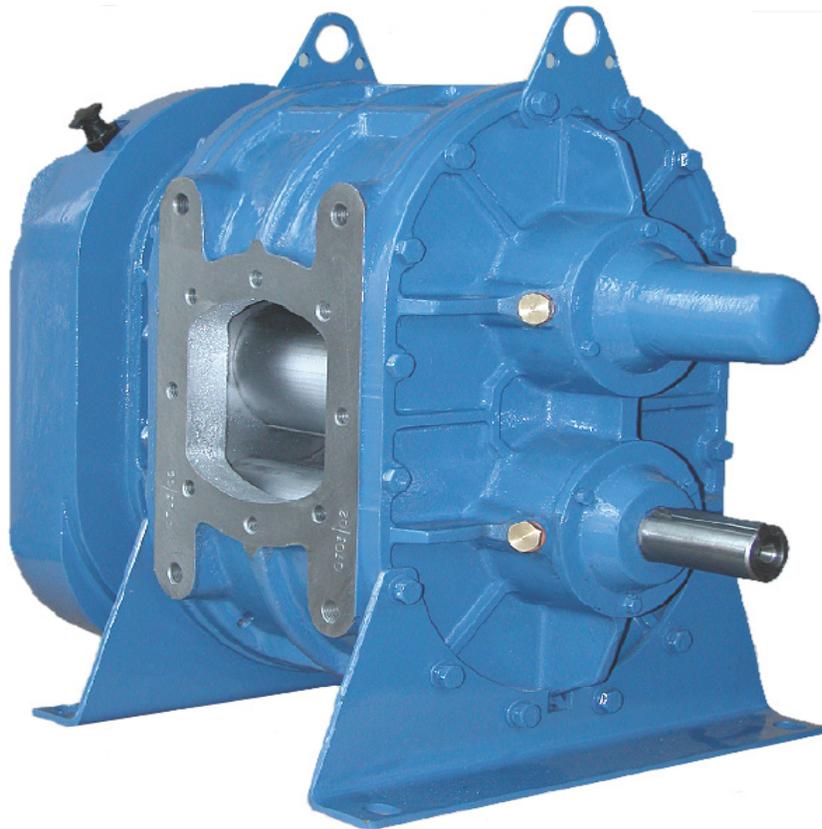


TRANSAIRVAC **INTERNATIONAL LTD**

Hydraulic Coolers, Pressure Line Filters, Air & Gas Compressors / Vacuum Pumps / Blowers / Booster Packages and Rotary Lobe Pumps for Transport and Industry

VR113, 142 AND 170 BLOWERS

OPERATION AND INSTALLATION MANUAL



*Evolution
Blower*



Transairvac International Ltd, Units 12, 13 & 15 Croft Road Industrial Estate,
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1 General Information

To ensure immediate advice on your VR113, 142 and 170 products and for your own records the following information should be noted:

SERIAL No. [S].....

MODEL No. [S]

DATE OF SUPPLY.....

CONTRACT NUMBER.....

CUSTOMER NAME.....

This information will be required should you need further information or parts ordering.

One of the primary features of the VR113, 142 and 170 BLOWER is its ease of operation and minimal maintenance requirement. To maximise the efficiency and working life of your VR113, 142 and 170 blowers, please read this instruction manual carefully. It has been prepared to help you properly and safely install, operate and maintain your equipment. Store this instruction in a safe place for future reference.

2 Health and Safety

Rotating machinery and pressurised components are potentially dangerous items of equipment if not properly operated and maintained. It is imperative that all users of such equipment fully educate themselves as to the potential dangers and satisfy themselves that the personnel responsible for installing, testing, commissioning, operating and maintaining the machinery are competent to do so. Instruction manuals are provided for guidance but must assume some basic level of competence by user staff. If there are any doubts concerning correct procedures, ask Transairvac International Ltd., who will be pleased to advise, or provide a service engineer. DO NOT TAKE RISKS.

The following, whilst not exhaustive, provide guidance to possible sources of danger to health and safety:

Certain machinery can generate high levels of noise which can be harmful to people exposed to it for lengthy periods of time. Various recommendations and codes of practice are in existence and users must ensure that adequate precautions are taken to prevent a health hazard to employees or third party.

Before attempting to investigate problems, service or maintain equipment, it must be safely depressurised to ambient conditions.

Moving parts of machinery must not be touched and must be adequately guarded. Suitable guards are provided and must be securely retained in position at all times except when maintenance or service is being undertaken. Before commencing maintenance, servicing or making other adjustments, the prime mover and other equipment must be isolated to prevent accidental start-up.

Most machines, certain pipes and ancillaries become hot during operation. If it is possible for personnel to come into contact with such surfaces unknowingly or accidentally they should be guarded.

If, during operation, severe vibration is observed on the compressor its prime mover, pipe work, or ancillaries, the cause of this should be immediately investigated and the situation rectified. Excessive vibration can lead to fatigue and other failures. Similarly, if during operation a significant change is noticed in the level of vibration, noise, temperature or any other parameter, the cause of such changes must be determined, and the cause rectified.

Inlet filters and separators must be inspected regularly so that liquid or debris is not allowed to enter the machine. Drainage systems must also be serviced regularly to ensure that there is no liquid carryover, which could cause damage to the machine and consequently injury to personnel.

Safety trips (pressure relief valve), emergency stop buttons and other such devices should be checked regularly to ensure they function correctly and will protect the machinery and personnel in the event of an emergency.

When maintaining equipment, contact will be made with mages with potentially corrosive substances. Care must be taken not to ingest any of these and to protect skin. Only approved lubricants must be used.

After completion of servicing, all nuts, setscrews, etc must be checked for tightness. Before restarting after servicing, check all joints, etc are gas tight. Also, before any start-up, check that the machine inlet and outlet isolating valves are open.

PRECAUTIONS

- Always disconnect electrical power to prevent accidental starting when working on any rotating element.
- Always keep hands, feet and any loose clothing away from moving parts.
- Never operate unit with belt guard removed.
- Never allow foreign material to enter the unit. This could result in damage to the equipment, and/or personal injury.

SHOULD YOU HAVE ANY QUESTIONS REGARDING THIS EQUIPMENT PLEASE DO NOT HESITATE TO CONTACT OUR OFFICE ON TEL.NO. 0044 (0) 1782 – 710282

3 HANDLING

If you are installing a bare machine, position it by lifting with sling around its housing. When installing a complete unit, lift by inserting hooks into the lifting holes located in each corner of the base.

Never lift with sling around blower/exhauster shaft.

4 INSTALLATION

4.1 LAND BASED LOCATION AND INSTALLATION

Remove shipping skids. Leave inlet/outlet covers in place until ready to connect piping to unit to prevent possible entrance of foreign material. Mount unit on a firm, level surface, using the base pads provided. Locate one pad under each corner of the base. If studs are used to locate the unit base on the foundation do not fasten the unit to the foundation with nuts.

We do not recommend that the unit be grouted in place. If grouting is required a flexible grout should be used. Use flexible connections to connect piping to machine. Failure to do so may cause damage to the unit due to normal thermal expansion.

CAUTION: DO NOT ALLOW FOREIGN MATERIAL TO ENTER THE BLOWER/EXHAUSTER. ALL PIPING SHOULD BE CLEANED PRIOR TO CONNECTION OF THE UNIT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN DAMAGE TO THE UNIT, AND/OR PERSONAL INJURY.

4.2 VEHICLE LOCATION AND INSTALLATION

- When installing on a road vehicle or trailer ensure the unit is securely mounted with the correct fixings with suitable anti vibration devices.
- Protect the unit from external damage (stones/spray/salt/ etc).
- Please ensure that the drive method to be used is correct for the application. Further technical assistance is available if required.
- All safety devices must be suitably incorporated within the system. It is the responsibility of the installer to check that this is done according to the relevant code of practice.

CAUTION: DO NOT ALLOW FOREIGN MATERIAL TO ENTER THE BLOWER/EXHAUSTER. ALL PIPING SHOULD BE CLEANED PRIOR TO CONNECTION OF THE UNIT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN DAMAGE TO THE UNIT, AND/OR PERSONAL INJURY. IN ADDITION, DO NOT STAND IN LINE WITH OPEN DISCHARGE. DIRT PARTICLES EXITING AT HIGH SPEED COULD CAUSE SERIOUS INJURY.

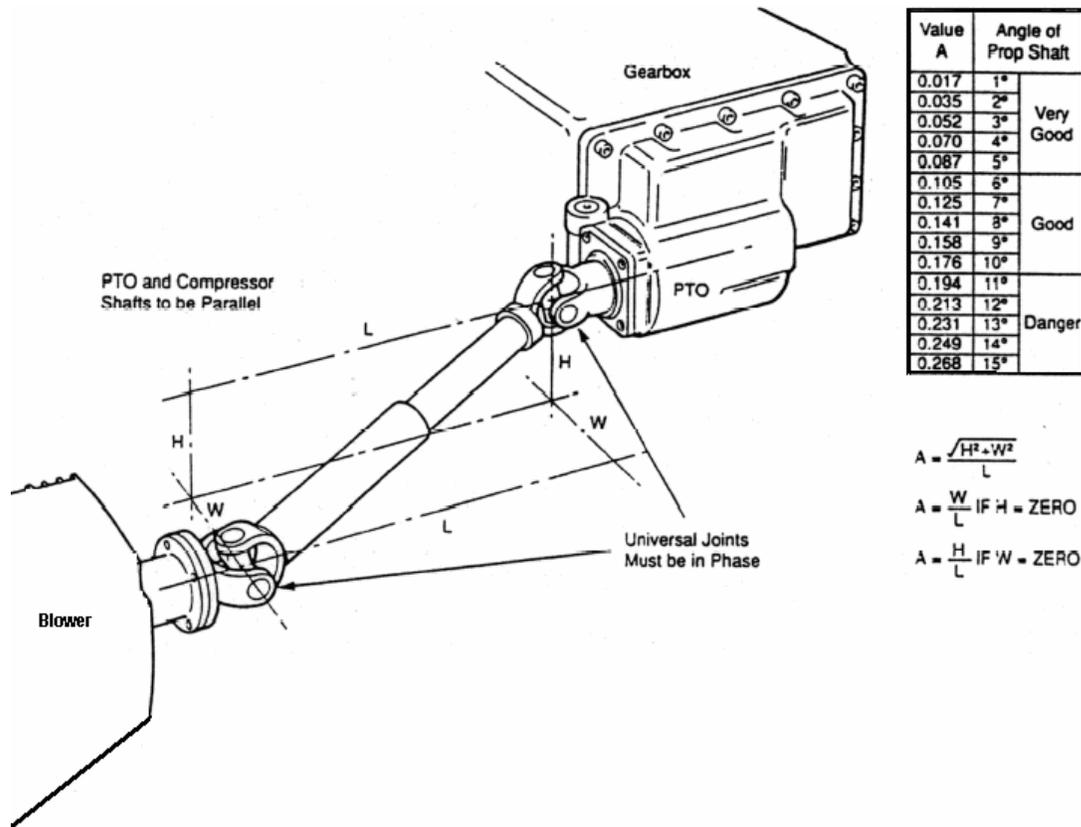


Figure 1: PTO – Prop Shaft Drive System

4.3 ALIGNMENT

Blower/exhauster units are properly aligned at the factory, but may become misaligned during shipment. The alignment must be checked prior to operation. Pulleys and drive belts must be clean and dry. For maximum drive belt and bearing life, pulleys must be properly aligned and drive belt tensioned correctly.

Check alignment with a straight edge placed across the face of both pulleys. If alignment is correct, the straight edge will fully rest on both faces. If pulleys are not parallel, realign. When replacing a drive belt, always loosen motor and move toward the machine.

NEVER FORCE A DRIVE BELT OVER THE PULLEYS.

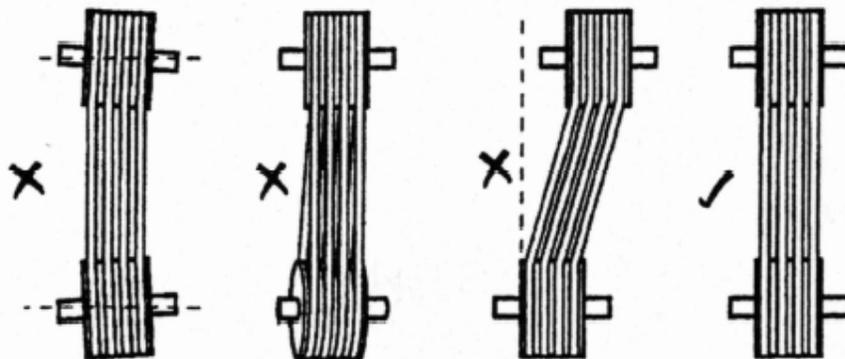


Figure 2: Belts Alignment

WARNING: OVERTIGHTENING THE BELTS CAN CAUSE BEARING FAILURE

Step 1

- 1) Lock the drive unit in position
- 2) Measure the actual centre distance B
- 3) Calculate $M \text{ (mm)} = B \text{ (m)} \times 16$

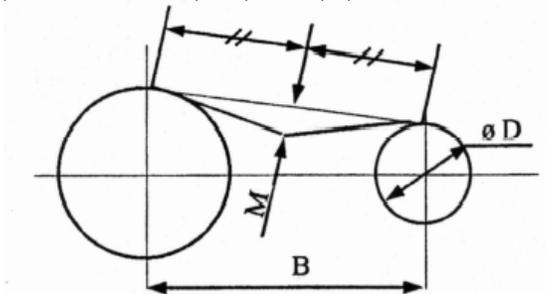


Figure 3: Belt Tension Setting

Step 2

- 1) Set the belt tensioning device to the 'M' position on the mm scale.
- 2) Using the tensioning device, measure the force 'F' which is required to deflect the belt at mid-span by 'M' mm.

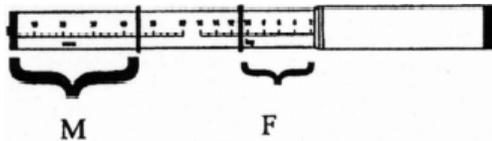


Figure 4: Belt Tensioner

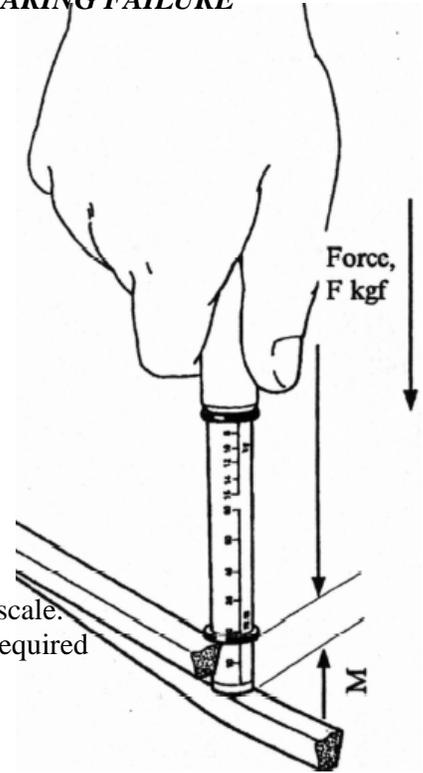


Figure 5: Belt Tensioner Used

Step 3

If necessary, slacken and adjust to the correct tension indicated in the table.

If new belts are being fitted, adjust the tension to the maximum permitted, this is to allow for initial belt stretch.

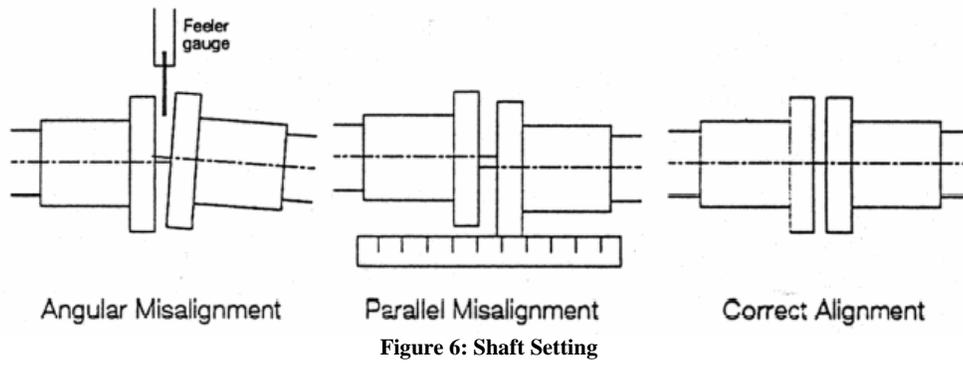
NOTE

- 1) Re-check the belt tension after 30 minutes running.
- 2) If the vacuum pump is supplied on a bedplate with belts and pulleys already fitted, the alignment and tension still needs to be checked once the bedplate has been installed and check again after 30 minutes.

Belt	Minor Pulley Diameter, D (mm)	F(kgf)
SPB	112 to 224	3.6 to 6.6
SPB	236 to 315	6.6 to 8.7
SPC	224 to 355	8.7 to 11.2
SPC	375 to 560	11.7 to 15.3

Table 1: Belt Setting

COUPLING ALIGNMENT



4.4 DRAWING LAYOUT

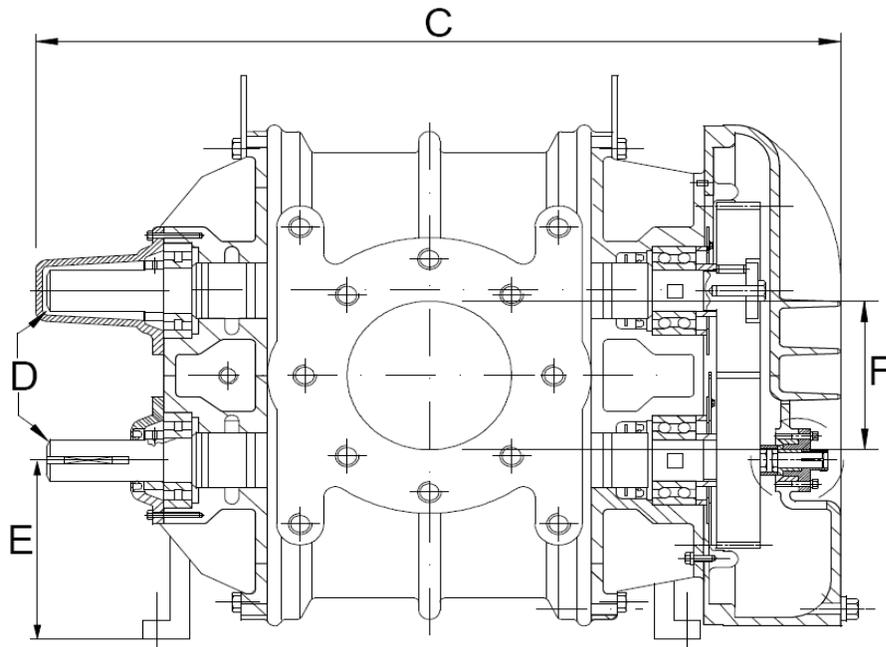


Figure 7: Side View Layout

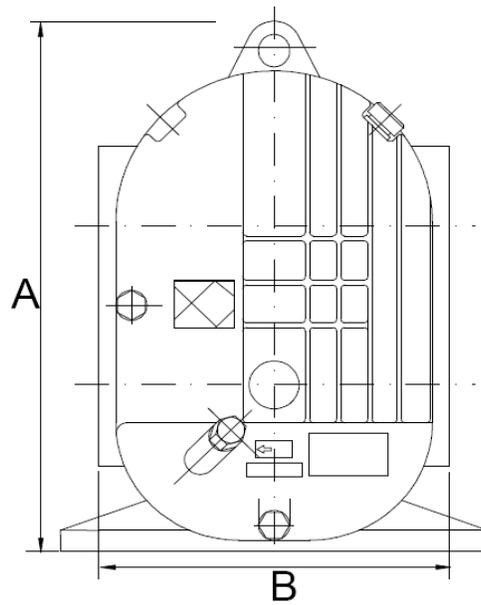


Figure 8: Front View Layout

	A mm	B mm	C mm	D shaft mm	E mm	F Bore mm	Weight (kg)	Pressure Max (Barg)	Flow Max (m ³ /hr)
VR 113	545	305	645	38	179	100	129	1.2	1900
VR 142	545	330	685	38	179	125	152	1.0	2500
VR 170	545	330	725	38	179	150	168	0.8	2800

Table 2: The VR 113, 142 and 170 dimension

4.5 MOUNTING THE BLOWER

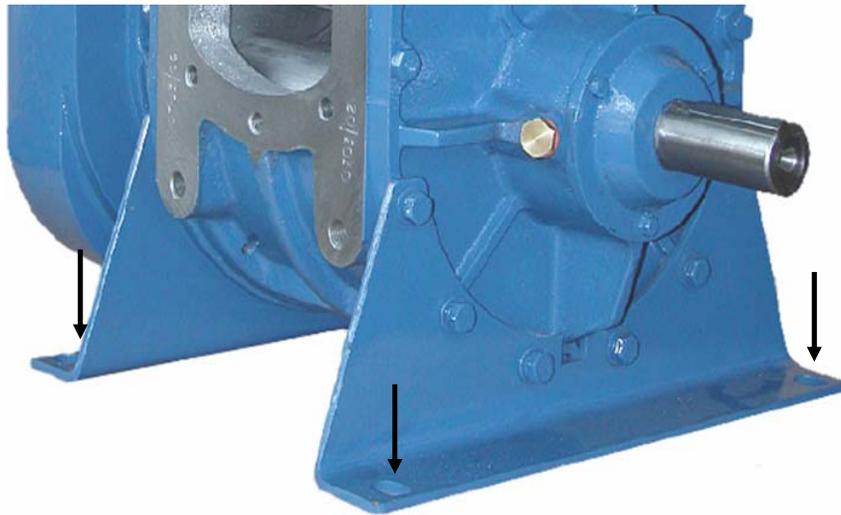


Figure 9: Mounting Base

The arrows indicate the place for the screws to be mounted.

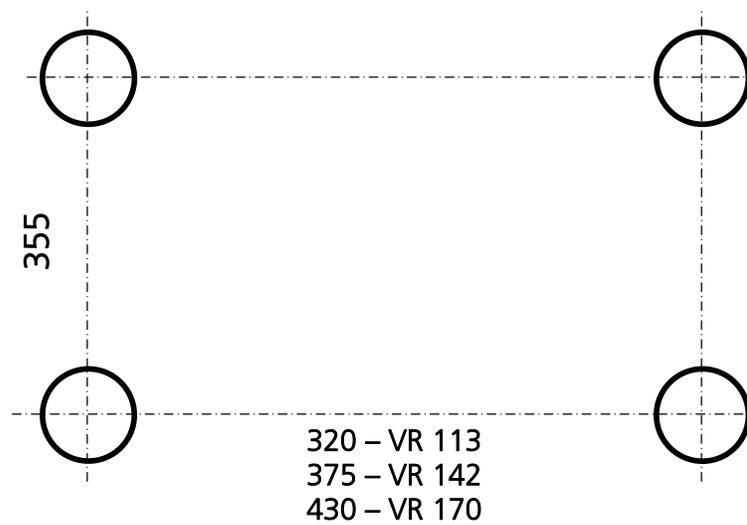


Figure 10: Mounting Base Dimension

4.6 DRIVING THE BLOWER

4.6.1 BELT DRIVE

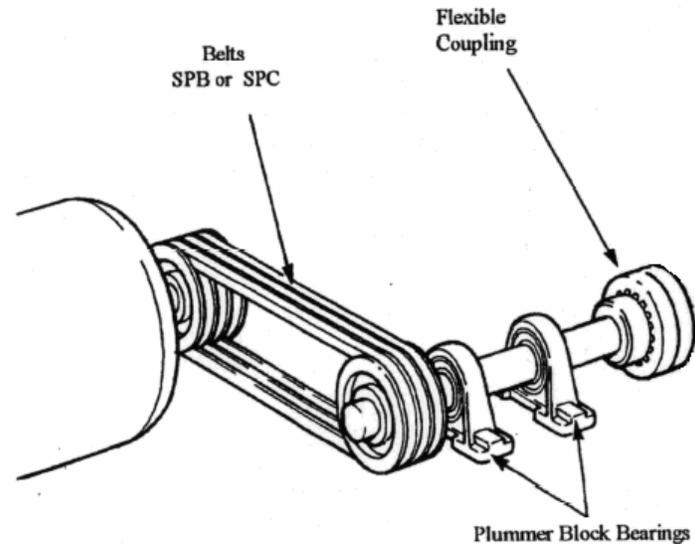


Figure 11: Drive Blower by Belt

A force must be applied at right angles to the belt in the centre of the span. When correctly tensioned the belt should deflect by 16mm for each meter of span. Please refer Alignment chapter for belt tightening.

4.6.2 DIRECT DRIVE

For direct drive, a flexible coupling must be used. When fitting a coupling follow manufacturer's instruction for alignment.

IMPORTANT: ACCURATE ALIGNMENT IS ESSENTIAL TO PROLONG LIFE OF COUPLING AND TO AVOID PREMATURE SEIZURE OF BLOWER/MOTOR BEARINGS

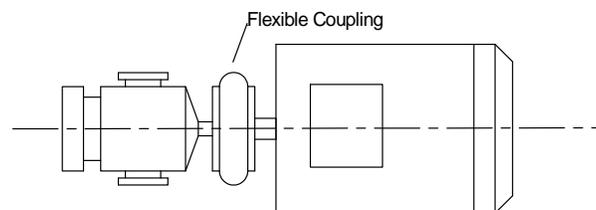


Figure 12: Direct Drive by Electric Motor

5 OPERATION
5.1 PERFORMANCE CURVE
5.1.1 VR113

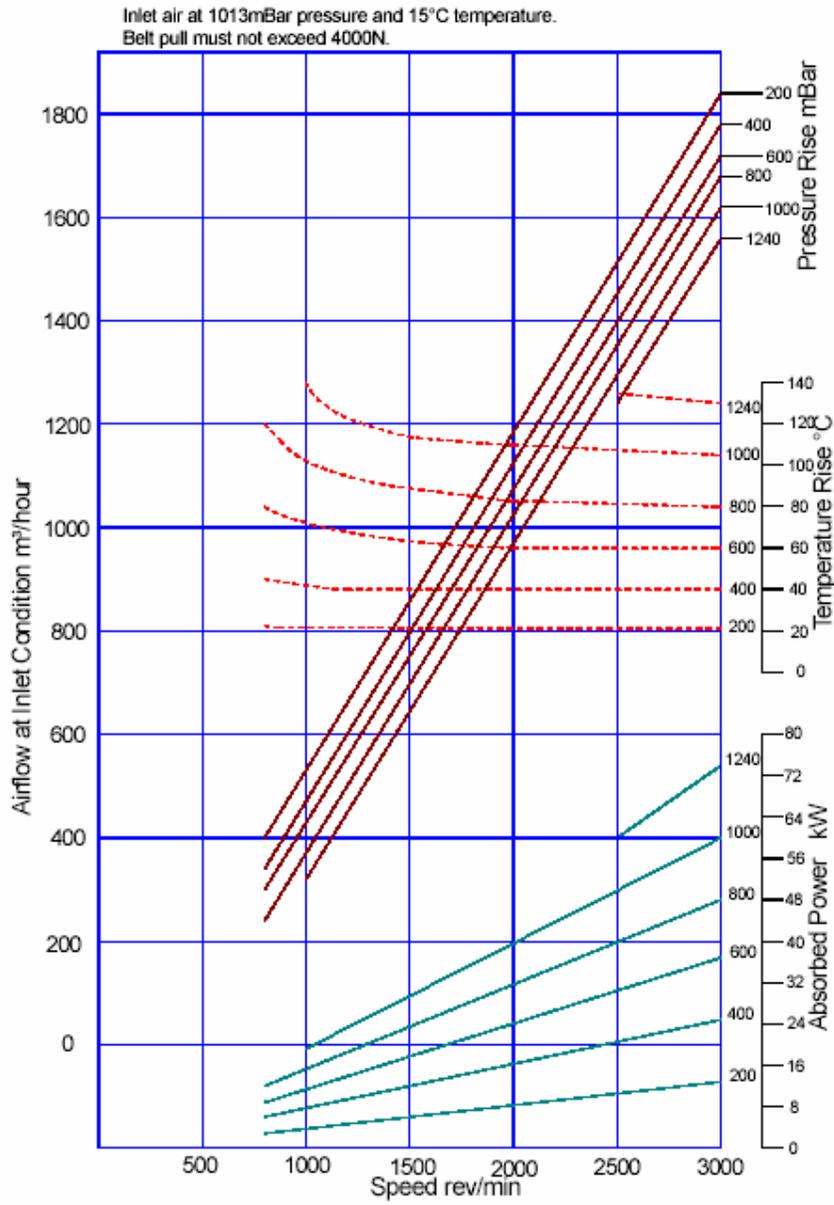


Figure 13: VR 113

5.1.2 VR 142

Inlet air at 1013mBar pressure and 15°C temperature.
Belt pull must not exceed 4000N.

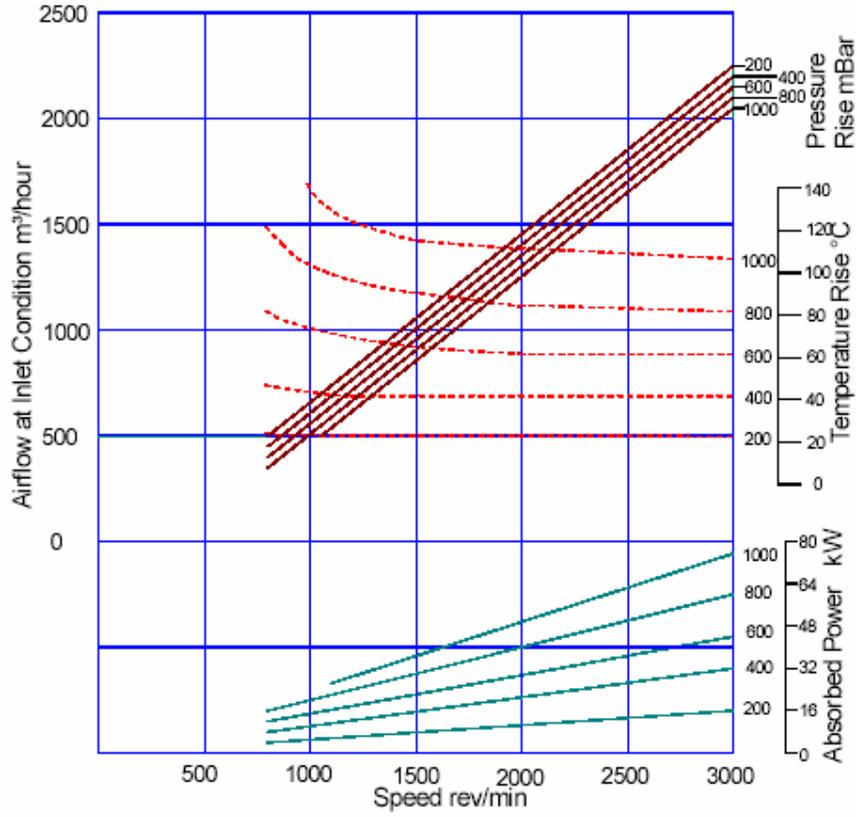


Figure 14: VR142

5.1.3 VR 170

Inlet air at 1013mBar pressure and 15°C temperature.
Belt pull must not exceed 4000N.

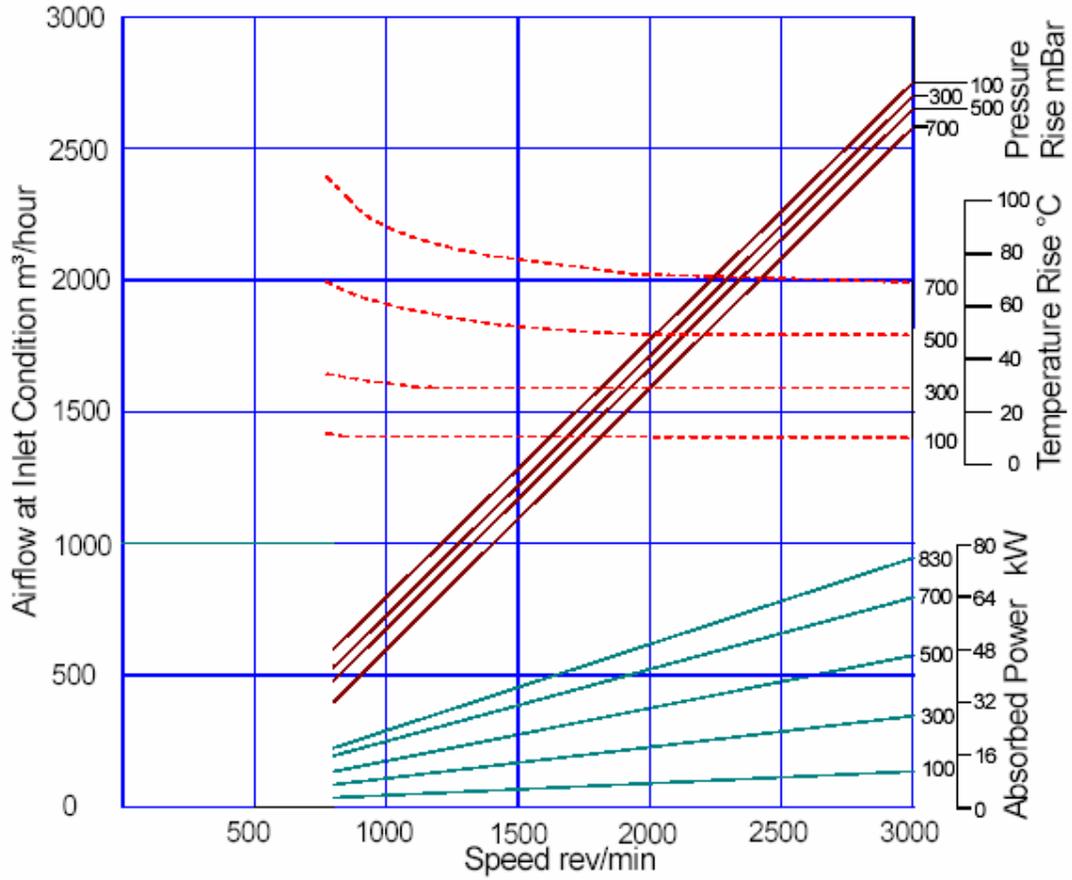


Figure 15: VR170

5.2 DIRECTION OF ROTATION

All models are bi-rotational and are ordered from the factory in either the horizontal or vertical airflow position. Inlet/outlet airflow is determined by the position of its shaft (top or bottom) and the direction of rotation.

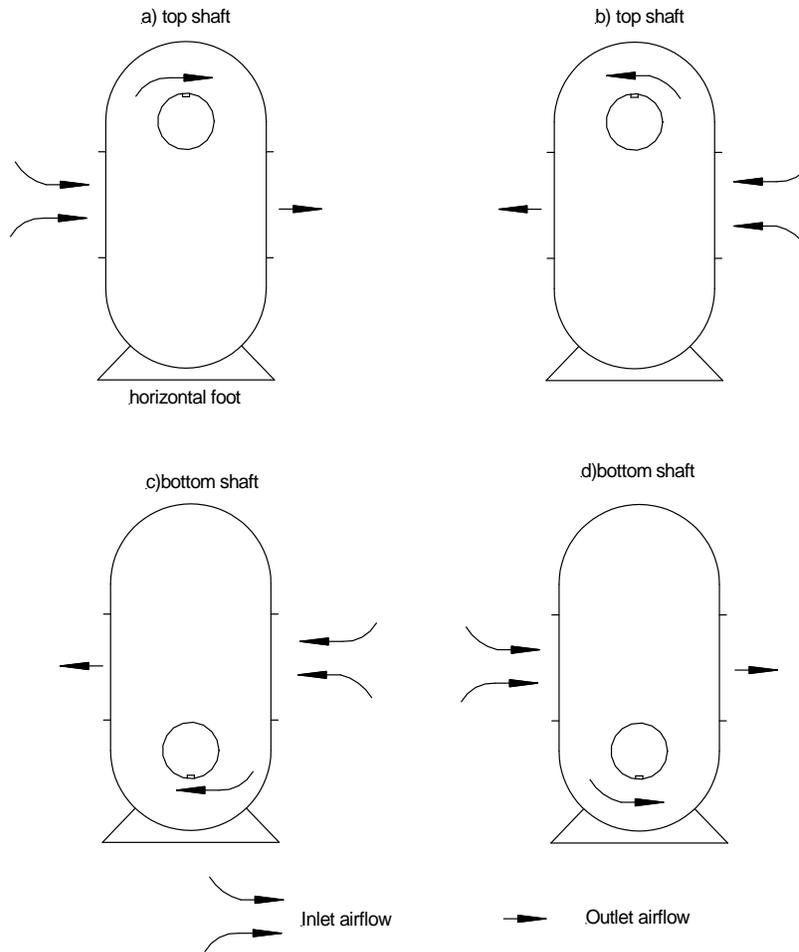


Figure 16: Airflow relative to the direction of rotation

5.3 LUBRICATION RECOMMENDED OILS AND GREASES

MAKER'S NAME	TEMPERATURE RANGE	
	-30 °C to 0 °C AND 35 °C to 49 °C	0 °C to 35°C
OVALINE	HYPO 80W/90	HYPO 80W/90
SHELL	TELLUS33 OMALA460	OMALA220
BP OIL INT	ENERGOL GR-XP68 ENERGOL GR-XP460	ENERGOL GR-XP220 CASTROL HYPIN AWS68 ALPHA SP460
ESSO	UNIVIS N46	GP85W/140
GULF	MULTI PURPOSE GEAR LUBRICANT GRADE 80W/90 GRADE 85W/140 HARMONY OIL EP LUBRICANT GRADE 68AW GRADE HD460	GEAR LUBRICANT GRADE 90 GULF EP LUBRICANT GRADE HD220
MOBIL	MOBIL GEAR 624 MOBIL GEAR 634	MOBIL SHC630
TEXACO	RANDO HDCZ 58 MULTI-GEAR EP140 TEXACO MEROA220	MULTI-GEAR EP90 MEROA480

Table 3: Recommended Oils

The Mobil SHC Oils are Synthesised Hydrocarbon Oils which have very good resistance to oxidation and are recommended where high temperatures are encountered.

RECOMMENDED Greases

MAKER'S NAME	TEMPERATURE RANGE	
	-30 °C to 0 °C and 35 °C to 49 °C	0 °C to 35°C
SHELL	AEROSHELL5 AEROSHELL5 BPOILINT ENERGREASE LSEP2	AEROSHELL5 ENERGREASE ENERGREASE LSEP2
CASTROL	SPHEEROL EPL2 - BEACON 2	SPHEEROLEPL2 BEACON 2 BEACON2
GULF	GULFCROWNEP2 GULFCROWNEP2 MOBIL MOBILPLEX47 MULTIFAK EP2 MULTIFAK EP2	GULFCROWNEP2 MOBILPLEX47 MOBILPLEX47 TEXACO MULTI FAK EP2

Table 4: Recommended Greases

AEROSHELL 5 Grease is strongly recommended.
All Blowers are assembled using this grease.

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VR BLOWER MAINTENANCE SCHEDULE

WARNING: Before carrying out maintenance procedures, ensure that the blower cannot operate.

Air Filter

The air filter must be cleaned frequently; a dirty filter will increase power consumption and operating temperatures.

1. To clean a typical filter with plastic element:

- 1.1 Remove the screw retaining the top cap.
- 1.2 Remove the cap and filter element.
- 1.3 Wash the element in a mild household detergent, allow to dry, and then refit.

Note: check with individual filter manufacturers for specific cleaning recommendations.

WEEKLY - Check operation of pressure relief valve (PRV). Check blower and ancillaries for damage. Check all mounting and bolts for tightness.

Lubrication

Gear end oil level (weekly)

2. To check the oil level:

- 2.1 Remove the oil level plug and oil filler plug from the gear end cover.
- 2.2 Pour in the recommended oil slowly until it overflows from the oil level hole (OVALINE HYPO 80W/90)
- 2.3 Refit the plugs.

Gear end oil change (1000 hours)

3. To clean the sump:

- 3.1 Remove the oil level plug, the filler plug and the drain plug from the gear end cover. Allow the dirty oil to drain out into an appropriate container.
- 3.2 Flush the sump then refit the drain plug.
- 3.3 Fill the sump with recommended oil then refit the oil level plug and the filler plug.

Drive end grease replenishment (2000 hours)

4. During assembly the drive end bearings are packed with grease which should be replenished normally after 2000 running hours. The grease should be applied through the grease nipples in the bearing covers. Some models are fitted with automatic grease pots. Over greasing is prevented by the grease relief valves fitted in the covers opposite the nipples. These should be periodically wiped clean to prevent any blockages occurring.



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5.4 SPARES

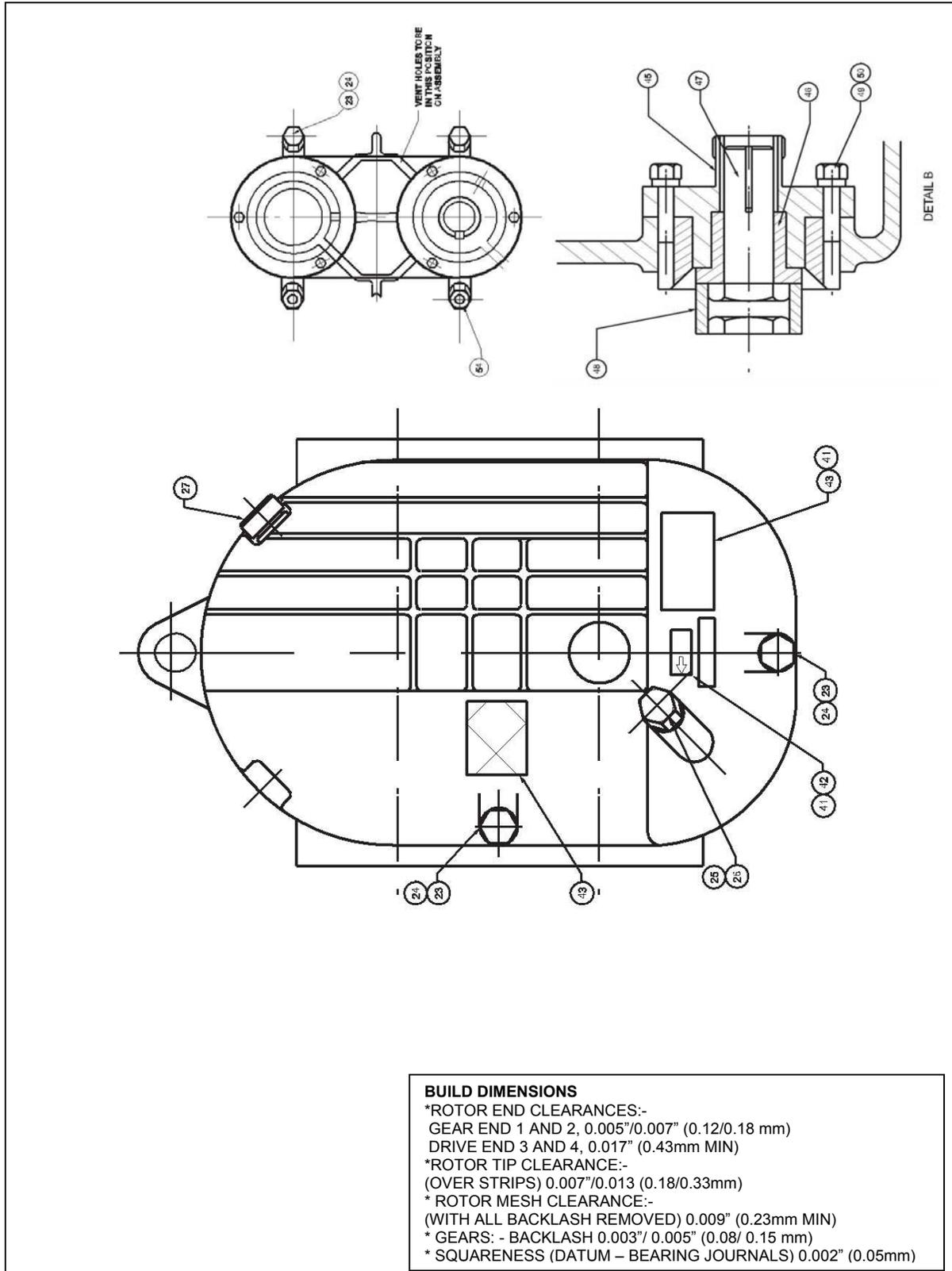


Figure 17: Cross Sectional Labeled Spares Drawing

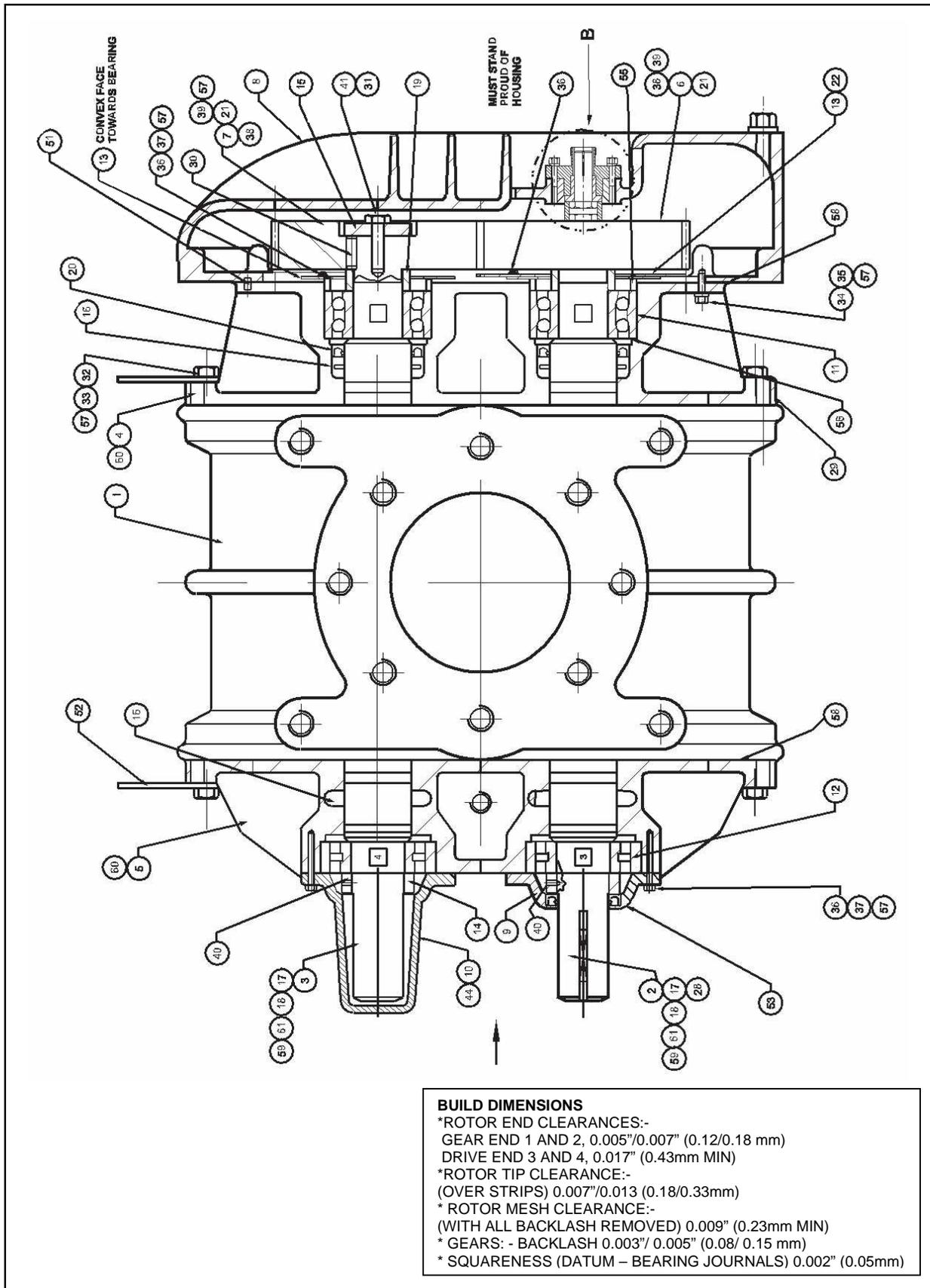


Figure 18: Cross Sectional Labeled Spares Drawing

ITEM	VR PART NO.			DESCRIPTION	QTY
	VR113	VR142	VR170		
1	7945	7989	5989	CASE	1
2	102509	102510	102511	ROTOR (1-3)	1
3	102509	102510	102511	ROTOR (2-4)	1
4	7787	7787	7787	HOUSING (BALL BEARING)	1
5	7946	7946	7946	HOUSING (ROLLER BEARING)	1
6	8457	8457	8457	GEAR (1-2)	1
7	8457	8457	8457	GEAR (2-4)	1
8	8132	8132	8132	COVER (GEARS)	1
9	7841	7841	7841	END CAP (1-3)	1
10	7842	7842	7842	END CAP (2-4)	1
11	6259	6259	6259	BALL BEARING	2
12	4978	4978	4978	ROLLER BEARING	2
13	3980	3980	3980	RETAINER (BALL BEARING OUTER)	2
14	8148	8148	8148	RETAINER (ROLLER BEARING INNER)	2
15	3971	3971	3971	RETAINER (GEAR)	2
16	6226K	6226K	6226K	DEFLECTOR (AIR)	4
17	4294	4318	4321	ROTOR SEALING STRIP (PTFE)	4
18	4071	4071	4071	ROTOR END ENCLOSURE	4
19	6258	6258	6258	GEAR SPACER	2
20	7843	7843	7843	LIP SEAL (BALL HOUSING)	4
21	8456	8456	8456	GEAR CARRIER	2
22	5139	5139	5139	OIL COLLECTOR	1
23	100515	100515	100515	FLANGED PLUG 1/4" BSP	4
24	102739	102739	102739	PLUG SEAL WASHER	4
25	102713	102713	102713	LEVEL PLUG 3/4" BSP	1
26	102737	102737	102737	LEVEL PLUG SEAL WASHER	1
27	7784	7784	7784	BREATHER (ELISA)	1
28	10089	10089	10089	KEY 3/8 SQ. x 2-1/2	1
29	100177	100177	100177	DOWEL (CASE / HOUSING)	4
30	100173	100173	100173	DOWEL (GEAR)	6
31	100518	100518	100518	SCREW M12 x 40 HEX. HD	2
32	10113	10113	10113	SCREW M10x40 HEX. HD	32
33	100520	100520	100520	SPRING WASHER M10 SQ. SEC	32
34	100521	100521	100521	SCREW M8 x 25 HEX. HD	12
35	100522	100522	100522	SPRING WASHER M8 SQ. SEC	12
36	100536	100536	100536	SCREW M6 x 25 HEX. HD	16
37	10052	10052	10052	SPRING WASHER M6 SQ. SEC	16
38	100530	100530	100530	SCREW M10 x 35 HEX. HD	12
39	4748	4748	4748	PRESSURE WASHER	12
40	10353	10353	10353	GRUB SCREW M5x8	4
41	100526	100526	100526	DRIVE SCREW	12
42	6530	6530	6530	PLATE OIL LEVEL PLUG	1
43	100005	100005	100005	INSTRUCTION PLATE	1
44	100178	100178	100178	ARROW PLATE	1
45	3986	3986	3986	ADAPTOR	1
46	3987	3987	3987	BUSH	1
47	3988	3988	3988	SHAFT	1
48	3989	3989	3989	COUPLING	1
49	10428	10428	10428	SCREW M5 x 16 HEX. DH.	2
50	10127	10127	10127	SPRING WASHER M5 SQ. SEC	2
51	10091	10091	10091	SPRING PIN	1
52	7848	7848	7848	EYE PLATE	2
53	7849	7849	7849	LIP SEAL (END CAP 1-3)	1
54	102759	102759	102759	GREASE NIPPLE 1/4 BSP	2
55	6257	6257	6257	SPACER RING	2
56	3981A/B/C/D	3981A/B/C/D	3981A/B/C/D	SHIM	AR
57	-	-	-	LOCTITE-243	AR
58	-	-	-	FLANGE SEALANT-574	AR
59	-	-	-	LOCTITE-609	AR
60	-	-	-	LOCTITE-641	AR
61	-	-	-	ARALDITE	AR

NOTE : [(1-3) DRIVING],[(2-4) DRIVEN],[(AR) = AS REQUIRED]

Table 5: Part Number and Description



MACHINERY DIRECTIVE

(89/392/EEC: amended by 91/386/EEC and 93/68/EEC)

CERTIFICATE OF INCORPORATION

In accordance with article 4(2) and
Annexe 11B of the above directive.

We,

Transairvac International Limited
Unit 12/17 Croft road industrial est
Newcastle
Staffordshire
ST5 0TW
England.

Declare that all Hydraulic Coolers, Pressure Line Filters, Air & Gas Compressors / Vacuum Pumps / Blowers / Booster Packages and Rotary Lobe Pumps Associated Equipment supplied by us, which may include Electric Motors, must be installed in accordance with our installation instructions and must not be put into service until the machinery/system into which they are incorporated has been declared to be in conformity with the Machine Directive.

A handwritten signature in blue ink that reads 'P.A. Wood'. The signature is written over a horizontal dashed line.

Technical Director