POSITIVE DISPLACEMENT ROTORY AIR BLOWER

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Alpha Blowers®

(AN ISO 9001:2015 COMPANY)

www.alphablowers.com

KINDLY DO NOT OPERATE WITHOUT
READING MANUAL THOROUGHLY

INDEX :

A) IMPORTANT NOTES / INFORMATION :

1. Read operation manual for installation instructions, you must familiarize with this manual in order to ensure trouble free and safe operation of machine. Call ALPHA BLOWERS after-sales / service if you have any query.

2. ALPHA BLOWERS are **shipped without oil**. Do not fill oil until blower is mounted on operating location. Before operating, fill required amount of oil. Refer Point no. D8 for quantity and grade. Over filling may cause oil to leak. Check oil after every 48 operating hours.

3. Delivered blower sets are assembled as a complete unit as per purchase contract. Delivered belts are not installed on the machine

4. Each blower is provided with a name plate showing machine model and serial number. Any unauthorized modification of machine or any misconduct observed at the installation stage cancels the guarantee rights completely.

5. Minimum 800 mm clearance is recommended on all sides.

6. All blowers are meant for indoor installation or should be protected from direct rain and sunlight, if installed outdoor.

7. We recommend entrusting repairs and redesigns only to ALPHA BLOWERS specialists. If covered under guarantee period, the machine shall be disassembled only by ALPHA BLOWERS specialists or persons authorized by ALPHA BLOWERS. The Manual contains instructions only for use of standard blowers. The instructions for use of non-standard blowers and blower sets for transport of other gases must be consulted with us.

8. Delivery of ALPHA BLOWERS 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 ensure 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 corresponding legislation of the country where the blower is used.

9. All customer piping to be independently supported.

10. Stop the unit if any repair or any work on blower. Disconnect the blower unit from it's power source, tag and lockout before working on unit.

11. Use suitable protection and the equipment necessary for any probable hazards arising from the operation or installation of this machine.

12. Without acoustic enclosure, ears must be protected from noise levels.

13. The temperatures generated by compression within the blower can cause burns.

14. The Belt guard protection for the drive must always be attached and fitted correctly. If, for any reason, the unit is to be disassembled, it must be stopped beforehand.

15. The mountings for the blower, motor and accessories must be inspected regularly.

16. In order to avoid shock from static electricity, connect the earths for both the base frame cum silencer and the acoustic enclosure, as necessary. The earth connection must made using a cable with a minimum diameter of 6 to 16 mm^2 as per requirement.

17. An emergency stop button must be provided so the blower can be stopped if necessary.

18. Never start up the blower when either the suction or discharge, or both, are open.

19. When cleaning or removing oil/grease from the blower/motor, always do so when the machine is cold, using non-toxic liquids or mixtures. Some of these fluids can react violently to heat.

B) WARNING

The safety precautions set out above can be seen on stickers on each of the machines supplied. Under no circumstances should the stickers be removed, painted over or covered.

Non-fulfilment of or lack of attention given to these safety warnings could lead to serious injury to workers operating or maintaining the machine.

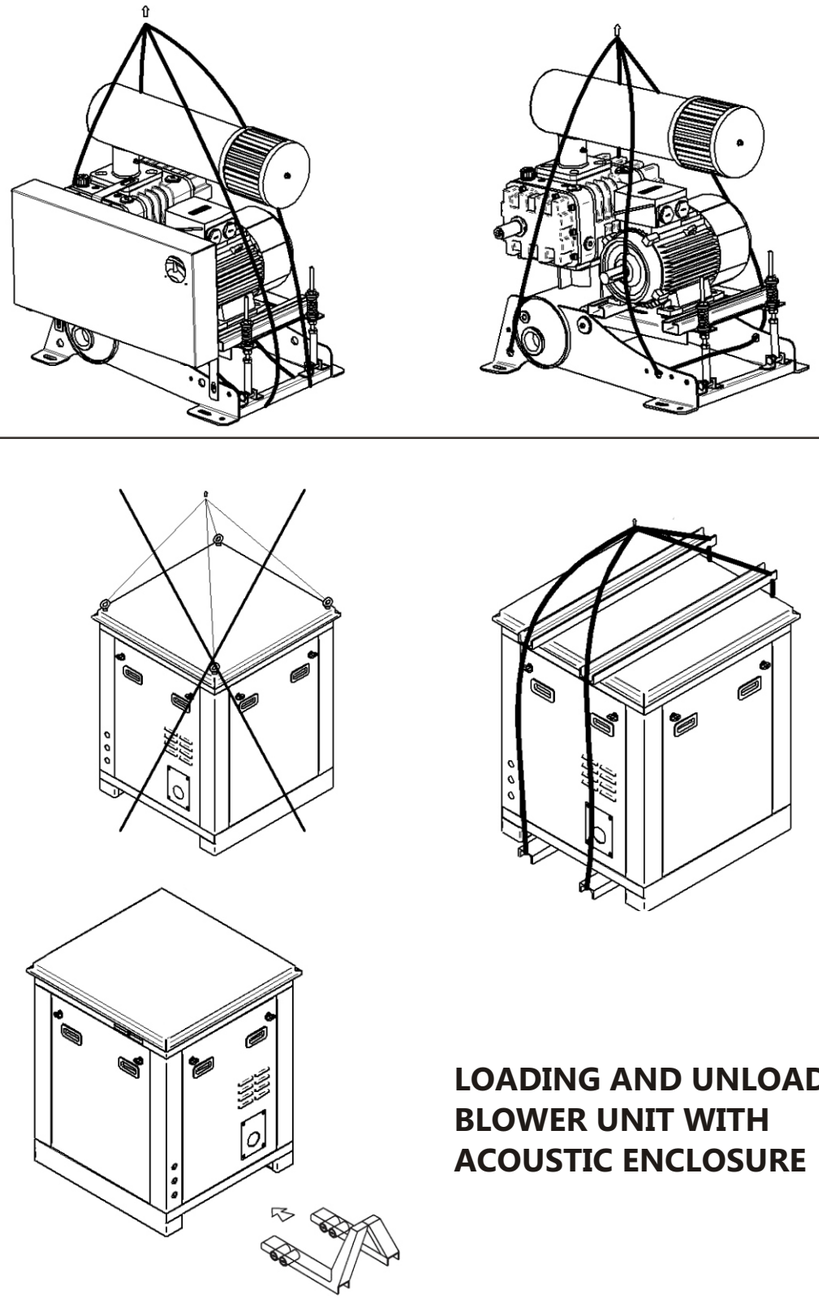
Keep your body and clothing away from the openings of the blower unit

Do not use the Blower unit if the protection guards are not correctly installed

Hearing protection required.

Do not touch hot surfaces.

C) METHODS OF LOADING AND UNLOADING :



LOADING AND UNLOADING BLOWER UNIT WITH ACOUSTIC ENCLOSURE

INSTALLATION, OPERATION
AND MAINTENANCE MANUAL

Alpha Blowers

D) INSTALLATION :

1. Equipment check :

Before uncarting, check the packing list carefully to ensure receipt of all parts. Note that all accessories are listed as separate items on the packing list. After confirming all items that are shown on the packing list are included, uncart carefully. Register a claim with the carrier for lost or damaged equipment immediately.

2. Location :

We recommend to install the Blower machine in a well-lit, dry, clean place with sufficient room for inspection and maintenance. All blower are meant for indoor installation or should be protected from direct rain and sunlight, if installed outdoor.

3. Foundation :

The flooring designed for installation must be levelled, free from all strains and dimensioned for the machine weight and anchor length. With respect to the loading capacity, no special requirements are stipulated for the floor design since both the blowers and motors are dynamically balanced. Before grouting, machine must be levelled, free of all strains, and anchored so no movement will happen during setting of grout.

Working Procedure for Anchoring Blower Sets and Acoustic Enclosure :

1. Insert the AV mount under the base frame and bolt to the base frame
2. Drill holes in the concrete
3. Anchor bolts to be tightened firmly

Refer below image (Fig. 1)

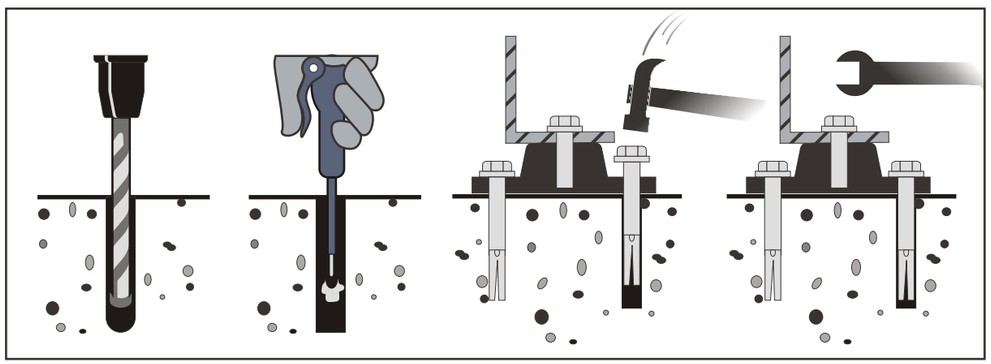


Fig.1 Foundation Details

4. Inspection of the Direction of Rotation

Rotation of the motor must be checked before installing the blower drive. Blowers are built for anticlockwise rotation seen from pulley side. Turn the blower on for no more than 1 second. If it were turned on for a longer time and the direction of rotation were incorrect, the blower could be damaged. The blower drive must rotate in the direction indicated in GA drawing.

5. Drive :

BELT DRIVE :

Belt drives must be carefully aligned (Refer Fig. No.2). Motor and blower pulleys must be parallel to each other and in the same plane. Belt tension should be carefully adjusted to the belt manufacturer's recommendation using a belt tension gauge (Refer Table 1). Check tension frequently during the first day of operation.

The recommended method for driving a blower is by using a wedge belt and pulley arrangement; or if the unit is to be driven directly, a flexible coupling can be used. When a variable speed drive (e.g. inverter control) is to be used, care must be taken to ensure that the blower does not run below its minimum speed else it may result in overheating and seizure.

This is particularly important when the speed is controlled automatically by feedback from a process monitoring device. Similarly, the machine should not be allowed to exceed its maximum operating speed.

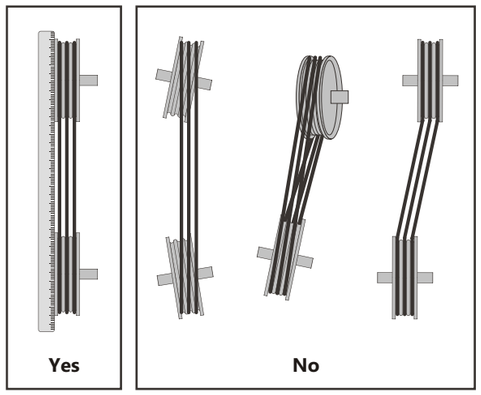


Fig.2 Pulley alignment

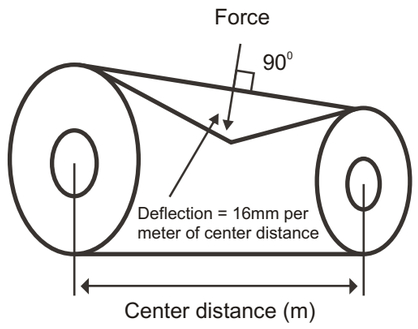


Fig.3 Wedge belt tension

Table 1 :

Force required to deflect belt 16 mm (per meter of span)			
Belt Section	**Smaller pulley Dia. (mm)**	**Newton (N)**	**Kilogram force (Kgf)**
SPZ	67 to 95	10 to 15	1.0 to 1.5
	100 to 140	15 to 20	1.5 to 2.0
SPA	100 to 130	20 to 27	2.0 to 2.7
	140 to 200	28 to 35	2.8 to 3.5
SPB	160 to 244	35 to 50	3.5 to 5.1
	226 to 315	50 to 65	5.1 to 6.5
SPC	224 to 315	65 to 90	16.5 to 9.2
	375 to 560	90 to 120	9.2 to 12.2

Check belt tension and adjust if necessary:

- After commissioning
- After every belt change
- After 30 minutes running
- After 24 operating hours.

6. Belt tension :

Loosen the nut (1) away from the motor pad. Loosen the nuts (2) against the spring washer and apply slight compression. Spin the pulleys 3 to 4 revolutions to bed the belts into the pulley grooves. Adjust the belt tension by moving two spring nuts (2) up or down as required. Once proper tension is achieved, tighten the top nut against the bottom nut to prevent it from loosening up during operation. Set nuts (1) about an inch below the motor pad and jam them against each other. In case of belt breakage, these nuts will prevent motor from falling further.

Set V-belt tension as per drive manufacturer recommendation using belt tensioner.

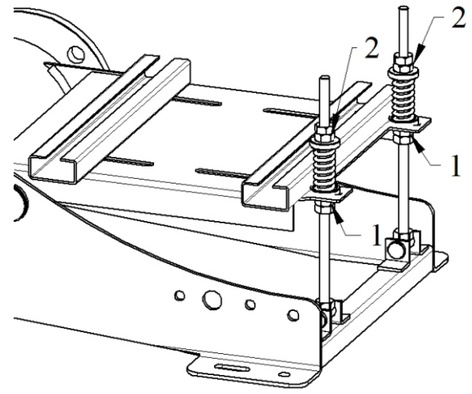


Fig.4

7. Direct coupling :

If the blower is to be directly connected in the field, follow the coupling manufacturer's specifications for alignment and location.

1. Installation :

ALPHA BLOWERS connected with a coupling, its alignment has been calibrated in the factory before shipment. The alignment may be damaged in handling processes, therefore if requires re-checking before operation. Check alignment using either “straight edge method” or a dial indicator taking measurements at four locations 90º apart to ensure alignment does not exceed the allowable misalignment as specified

- Axial Deflection : ±1 mm
- Radial Deflection : 1°
- Radial Deflection : 0.2 mm

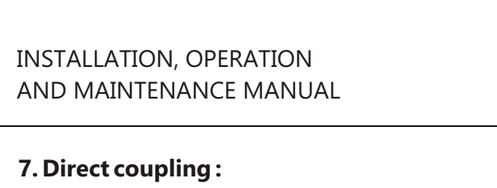


Fig. 4A

To ensure gape G Move the coupling into the proper location ,to achieve the value 'G' of 2 mm (ALF 2D), 3mm (ALF 3D,6D,8D) gap dimension between hub faces check in diagram. The hubs could be moved back on the shafts or overhung slightly to compensate for discrepancies in shaft separation.

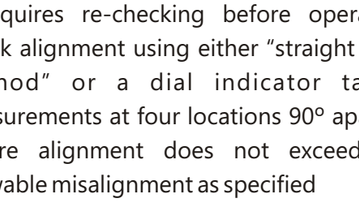


Fig. 4B

2. Start-up :

Before putting it into operation for the first time, the following parameters need to be checked :

- The tightening torque of all screws,
- The tightness of the set screws,
- The alignment of the coupling,
- The clearance G

During commissioning, attention must be paid to vibrations and running noises. If any vibrations or unusual running noises should occur, the drive unit must be immediately switched off. To ensure that the coupling can be operated safely, the specified wear values may not be exceeded.

3. Spider Condition Monitoring :

To check the conditions of a spider you have to check the thickness of the spider leg every month of its operation time. If the thickness of the spider leg is less than 75% of its original size then you have to change the spider. Also you can check wear values of 3 mm with Feeler gauge. Accurate alignment of coupling connecting shafts increases efficiency & life of spiders.

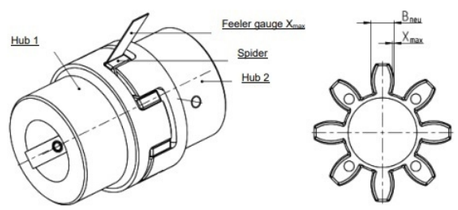


Fig. 4C

8. Lubrication :

Units are normally shipped without lubricating oil. Do not operate before lubricating. Before proceeding, fill the blower with lubrication of the correct type as detailed below. Lubricate motor as per manufacturer recommendation. For low and high temperature applications SYNTHETIC OIL should be used. It is also recommended for lighter ranges of applications. Mineral oil can be used for medium range of operating temperature (consult chart). The use of synthetic oil can reduce oil change frequency by 2 to 3 times. Equivalent oil types may not be compatible and must never be mixed. If you intend to change to different oil then the covers and bearings should be completely drained and flushed first. If in doubt of oil compatibility please consult your oil manufacturer.

The oil additives must possess below minimum properties:

- EP-wearing protection additives for the application in roller bearing gearboxes
- Oxidation stability up to an oil sump temperature of 110°C
- Foam suppressant
- Neutral characteristics in combination with seal materials made from Fluor Propylene-Methyl (Viton)

First oil change should be done within 100 operating hours and there after every 1000 hours or more often if oil gets dirty (For mineral oil)

Recommended oil :

	EP / SP 460	EP / SP 460
Description	Synthetic / mineral	Synthetic oil
Outlet air temperature	0 to 100 °C	100 to 120°C

Oil Qty. :

Blower Model No.	Drive end (litre)	Gear end (litre)
ALF 2 / ALF 2D	0.35	0.40
ALF 3 / ALF 3D	0.35	0.40
ALF 6 / ALF 6D	0.35	0.40
ALF 8 / ALF 8D	0.35	0.40
ALF 12	0.90	1.20
ALF 15	0.90	1.20
ALF 18	0.90	1.20
ALF 25	1.20	1.50
ALF 32	1.20	1.50
ALF 40	2.30	2.70
ALF 48	2.30	2.70
ALF 55	2.30	2.70

Recommended brands :

- Shell Omala-S2 G 460
- Castrol : Alpha EP 460
- Hindustan Petroleum : Parthan EP 460
- Indian Oil Corp. Ltd. : Servomesh SP 460

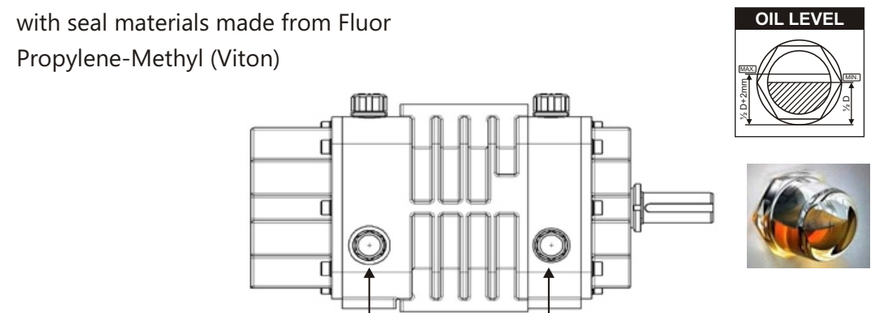


Fig.5

9. Storage :

In case the equipment is not to be installed immediately, store it in a clean, dry, constant temperature location. Keep covers and plugs on openings. Connect all furnished space heaters on electric motors. When outdoor storage is necessary, all equipment must be adequately covered with tarps and stored on a level surface above ground level. Be sure all openings are completely sealed. To ensure that the equipment is properly protected and without any sign of rust or corrosion, inspect it at least every four weeks if stored indoors, or every two weeks if stored outdoors. Any discrepancy must be immediately corrected. If equipment is to be stored for longer than 90 days, contact for recommendations. During storage, it is essential to prevent the machine from being subjected to vibration produced by the operation of nearby machines and propagated via the bearing surfaces. Vibrations applied for long periods could damage the machine and motor bearings.

For longer storage period (more than 3 months) kindly consult ALPHA BLOWERS.

10. Spares & Consumables :

Recommended spares set :

1. Ball bearings and Roller Bearings
2. Lip Seal and Sleeve
3. Piston Ring
4. Piston Sleeve
5. Oil Slight glass
6. Air Breather
7. Blower And NRV Gasket

Consumables :

1) Filter element
2) V belts
3) Lubricating oil

E) STANDARD ACCESSORIES :

1. Base frame cum discharge Silencer :

Discharge silencer is combination of base frame and silencer. It serves as a supporting element for the blower and is also designed to suspend and secure the swinging motor frame. Optimised belt-tensioning ensures outstanding efficiency and extends belt service life, consequently reducing the need for service and maintenance work.

2. Inlet filter cum Silencer :

Combination of dry air inlet filter and absorption type silencer with filter section situated downstream from the silencer chamber. Never operate the machine without the inlet filter as there is risk of machine damage!. The filter should be periodically checked for choking indicator. Choking of filter would result in pressure drop across it thereby increasing the load on the Blower marked by increase in power intake. Clean filter every fortnight. Replace filter element after every 4 months.

3. Non Return Valve (NRV) :

Non-return valve fitted nearby the discharge to prevent the blower from running in the opposite direction when switched off under load conditions. In multiple blower installations when two or more units discharge into a common header, use of non-return valves is recommended. One non-return valve should be located in each blower discharge line. Properly installed, they will protect against damage from reverse rotation caused by air back flow through an idle blower.

4. Pressure Relief Valve (PRV) :

The Pressure Relief Valve protects the blower and its accessories from damage in the event of excessive pressure. It is not to be used as a pressure regulating device. In positive pressure machines, it is installed downstream from the positive displacement blower and before the check valve or any shut-off valve. In vacuum applications, it is installed on the inlet side of the blower.

5. Flexible hose with clip :

A silicone-rubber discharge flexible hose with heavy-duty clamps is connected to the discharge piping. It prevents the transmission of structure-borne noise from the blower set to the discharge piping.

6. Piping and noise:

Noise emitting from the surfaces of either the suction or discharge pipelines is not included in the values of the equivalent levels of the sound. You must pay due attention when designing pipelines so that the excitation frequency of the Blower will not cause them to resonate. It is necessary to select optimum diameters, wall thickness, and material of the pipelines, and the anchoring method, including the distances of the supports for both the discharge and suction pipelines. Discharge pipeline & it's sound proofing in customer scope. All noise data are based upon machine emitted noise pressure level Lp(A) from each single blower unit. They refer to free field measurements (Tolerance ± 2 dB)

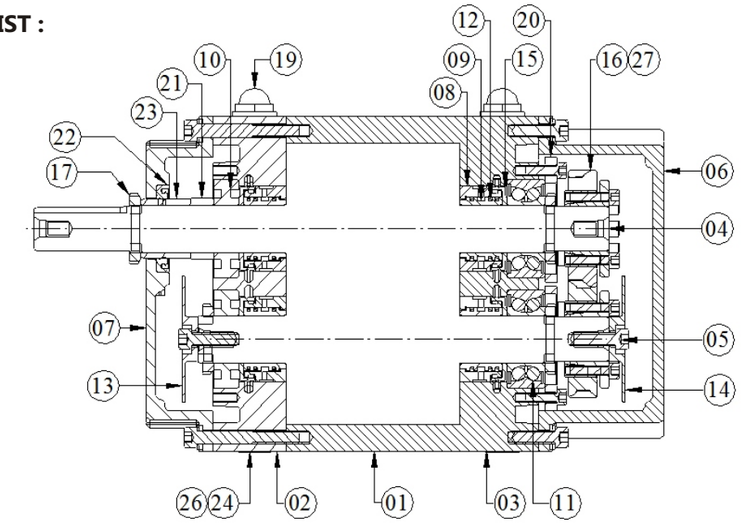
F) TROUBLESHOOTING :

Trouble	Possible Cause	Solution
Machine does not start	• Electrical connection • Rotors rub or damaged	• Check electrical supply and protection. • Restore clearance, or replace rotor.
No airflow	• Speed too low • Excessive pressure • Obstruction in piping	• Check speed and compare with GA drawing. • Check inlet vacuum & discharge pressure. Compare these figures with specified. • Check piping, valves, silencers, to assure an open flow path.
Excessive power consumption	• Pressure too high • Speed too high	• Check inlet vacuum & discharge pressure. Compare these figures with specified. • Check speed and compare with GA drawing. • Check outside of cylinder bore and side plates for rubbing reset timing and clearance.
Overheating of bearings and gears	• Inadequate lubrication • Excessive lubrication • Excessive belt tension & coupling misalignment	• Check oil level and replace worn oil. • Check oil level, if improper drain and refill clean oil. • Adjust correct belt tension & realign coupling if necessary.
Vibration	• Drive misalignment • Rotor Rubbing • Damaged bearings & gears • Blower & drive loosened bolt • Piping resonance	• Check alignment. • Check outside of cylinder bore and side plates for rubbing reset timing and clearance. • Check and replace bearings, gears & oil. Tighten and adjust them. • Check foundation, or check piping pressure • Check foundation, or check piping pressure pulsation are present in the piping. Contact service team.
Oil leak through ventilation opening	• High oil level	• Measure when blower is turned off & drain excessive oil
Loss of oil	• Gear case cover not tightened properly • Lip seal failure from side plate cover • Loose drain plugs	• Tighten Gear case cover bolt. • Dismantle & replace lip seal. • Tighten drain plugs.
Safety valve release air when blower working	• Excessive pressure • Failure of valve	• Measure over pressure in outlet pipe line & remove cause. • Remove leak from valve or contact service team.

G) MAINTENANCE PROGRAM :

	Operating Hours					
	After first few hours	Every week	After 700 hrs.	After 1500 hrs.	After 3000 hrs.	After 5000 hrs.
• Retightening belts	•			•	•	•
• Pulley and belt alignment and control		•				
• Belt change - Check wear & tear and change if necessary					•	
• Oil level and top up - Do not overfill as this will cause excessive or heating of the gears and may damage the unit	•	•				
• Oil change - Check oil condition and change if required or every 1000 hrs.				•	•	•
• Filter cleaning - Check condition and change if required		•				
• Blower rotation - Turn blower shaft by hand and check smooth running				•		•
• Pressure relief valve and Non-return valve - Check wear & tear and its operation				•		•
• Electric motor - Perform maintenance as indicated in the manufacture specification / manual						
• Pressure gauge control - Check & change if required - Check system pressure and specification		•				
• Check abnormal noise and vibration control		•				
• General inspection	After 8000 hrs. review by specialist authorized by ALPHA BLOWERS					
• Oil sight glass check & clean			•	•	•	•

H) PART LIST :



Item No.	Description	Qty
01	Cylinder	01
02	Side plate RB	01
03	Side plate BB	01
04	Rotor-drive	01
05	Rotor-driven	01
06	Gear case	01
07	Side plate cover	01
08	Piston seal	04
09	Piston Sleeve	04
10	Single row cylindrical roller bearing	02
11	Double row angular contact ball bearing	02
12	Piston ring	12
13	Oil slinger -RB	01
14	Oil slinger -BB	01

Item No.	Description	Qty
15	Seal guard disk	04
16	Helical gears	02
17	Lock nut	04
18	Air breather	02
19	Oil level sight glass	02
20	Ball bearing outer lock	02
21	Spacer	01
22	Oil seal	01
23	Oil seal sleeve	01
24	Oil plug	02
25	Dowel	04
26	Dowty washer	10
27	Key less locking	02

I) GUARANTEE :

Alpha Blowers Expressly guarantees in lieu of any warranty implied by law to make good of any defective parts in the machinery of our own manufacture, 18 months from the date of invoice or 12 months from date of commissioning, whichever is earlier, provided:-

1. That the defect develops under proper and normal use and arises solely from faulty material of workmanship.

2. That recommended lubricants and genuine spare parts have been used continuously.

3. That the equipment is erected and installed as per the drawings supplied by us and as per the written instructions for installations.

4. That is decided after the inspection and investigation by us at our works that the said defect arose out of defective material or workmanship.

5. That the defect does not arise out of fair wear and tear or damage due to negligence and improper handling or aggressive environmental conditions.

6. That those defective part/parts are neither reconditioned nor second hand nor modified.

7. That Alpha Blowers is responsible for the blower performance in a standalone position only. Alpha Blowers is not responsible for any system related issues or the system causing any changes in the ultimate performance of blower.

All Goods covered under this guarantee are supplied on the conditions that Alpha Blowers shall not be liable for any loss incurred through stoppages or any consequential damages. Guarantee is applicable for replacement of defective material, subject to the conditions that such defective parts returned, carried and paid to Alpha Blowers works and such parts become our due property. Replacement part shall be delivered free of cost to Works at Shiroli MIDC.

8. If you have any problems or doubts, please contact us on

mktg@alphablowers.com
project@alphablowers.com
sales@alphablowers.com
service@alphablowers.com

NOTE :
CHECK ALL THE MATERIAL AS PER PACKING LIST. REGISTER CLAIM FOR LOST OR DAMAGED MATERIAL WITHIN 15 DAYS FROM DATE OF DISPATCH. IF NOT CLAIMED IN 15 DAYS, WE WILL CONSIDER YOU HAVE RECEIVED COMPLETE MATERIAL AS PER PACKING LIST.

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