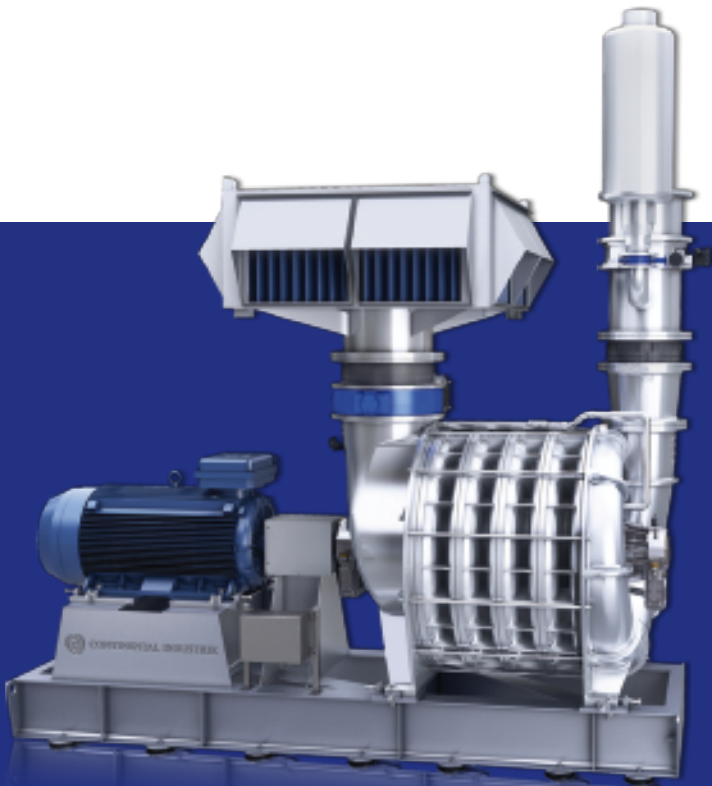


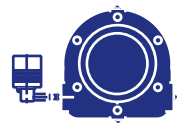
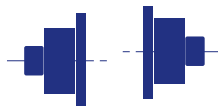


CONTINENTAL INDUSTRIE



Multi-stage Maintenance

Multi-stage Centrifugal Blowers



MULTI-STAGE CENTRIFUGAL BLOWERS MAINTENANCE

The design features of CONTINENTAL INDUSTRIE blowers have the advantage of requiring a minimum maintenance on them.

PREDICTIVE MAINTENANCE

Thanks to a predictive maintenance, you can ensure a perfect running of the machine. You can also evaluate the state of some components and program their change. Therefore, in addition to the normal lubrication operations to be carried out at pre-set intervals, it is advisable to keep a log for each machine, on which a record is kept of the progress over time of parameters which reflect the condition of the parts more commonly subject to wear.

In particular, it is recommended that the vibration level and temperature on the bearing housings is measured regularly; a study of the large number of readings thus obtained gives valuable information for assessing the need for replacement and thus for programming the intervention.

The above policy also can be applies to the electric motor bearings. Please check the motor manual supply with the project documents.

The level of wear of transmission belts must also be recorded so that the replacement operation can be carried out at programmed intervals.

Maintenance and Service Schedule

ATTENDANCE	TASKS
Daily Visual Inspection	<ul style="list-style-type: none"> - Check of oil level - Check of bearings vibration & temperature - Check of noises - Collect the measurements
Weekly visual inspection	<ul style="list-style-type: none"> - Cleaning - Check of the coating
Monthly (750 hours x heavy duty)	<ul style="list-style-type: none"> - Change of the grease - lubricated housings
For Month period (3.000 hours x heavy duty)	<ul style="list-style-type: none"> - Change of the grease - lubricated housings
Yearly	<ul style="list-style-type: none"> - Check of alignment - Check of fixing accessories - Check of performance

Continental Service Center

TASKS	ATTENDANCE	NOTES
Predictive Maintance - Service 1	<ul style="list-style-type: none"> - Monthly report of customer readings - On site inspection 	See details of intervention Service 1
Maintenance Intervention - Service 2	According to service 1 analisis	See details of intervention Service 2

Lubricating greases are composed of mineral oils or synthetic fluids dispersed in a thickening agent which determines its consistency, normally assessed in accordance with the NLGI classification (National Lubricating Grease Institute). Characteristics of grease used with CONTINENTAL INDUSTRIE standard blowers and exhauster.

HP-ST Grease
Density at 15°C : 0.900
Melting point : 200°C
Ash content : 0.8 %
Soap : Lithium
Temperature range -20°C to 140°C
EQUIVALENT GREASES
ESSO : BEACON 3
ELF : ROLEXA 3
TOTAL : MULTIS TIR
SHELL : ALVANIA EP3
MOBIL : MOBILUX EP3



- To keep the operating temperature of a bearing at its lowest possible value, and thus to obtain the maximum service life possible, the quantity of grease has to be kept to that strictly essential for purposes of effective lubrication.
- If there is excess of grease, the temperature of the bearing will increase suddenly, which substantially will reduce the service life and can cause irreversible damage.
- In such condition the bearings have to operate at temperatures far higher and are subject to premature wear.
- The excess of temperature may also reduce the consistency of the grease to values such that it is completely discharged from the housing and the bearing then continues to operate without any lubricant.
- The blowers are lubricated during the factory mechanical running test and therefore no re-lubrication is needed before the machine is first brought into operation.
- The lubrication periods shown in table 12.1 below are defined on the basis of bearing size, characteristics of use and type of service.
- The quantity of grease required for re-lubrication of each bearing is shown in the table.

MODEL	HEAVY DUTY	Q.TY/BEARINGS in gr.
08	750	5
20	750	5
31	750	10
51	750	10
77	750	20

All oil-lubricated CONTINENTAL Industrie blowers are fitted with a sump, placed directly in the bearing housing, in which the oil level is maintained by means of a constant level oil feeder and a oil nozzle disc.

During operation, this system produces actual oil circulation inside the housing which, in addition to providing the obvious lubricating functions, has an effective cooling action on the bearing and immediately removes any pollutants which may affect it. Particle pollutants of a magnetic nature are dealt with by appropriate magnetic plugs placed in the housing drains while other pollutants settle at the bottom of the sump.

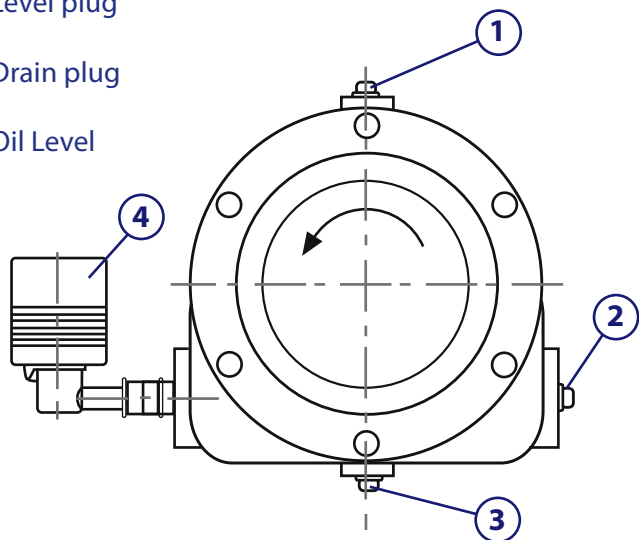
For the lubrication of ball bearings, mineral oils are generally used with the addition of additives to improve resistance to oxidation and the resistance of the lubricating film.

Viscosity is one of the main characteristics of lubricating oil and is a decisive factor when choosing oil.

Viscosity, like consistency with greases, falls as the temperature rises.

TECNICAL CHARACTERISTICS OF THE OIL USED BY CONTINENTAL INDUSTRIE

- 1. Filling plug
- 2. Level plug
- 3. Drain plug
- 4. Oil Level



JAROGEAR Z.150

Extreme-pressure oil ----- Service API - GLS

Properties

Extreme pressure, anti oxydating, anti corrosive, anti foam, anti-rust.

Resistant to alteration at high temperature.

Medium characteristics

Density at 15 °C 0.892/0.917

Cinematic viscosity in Cst:

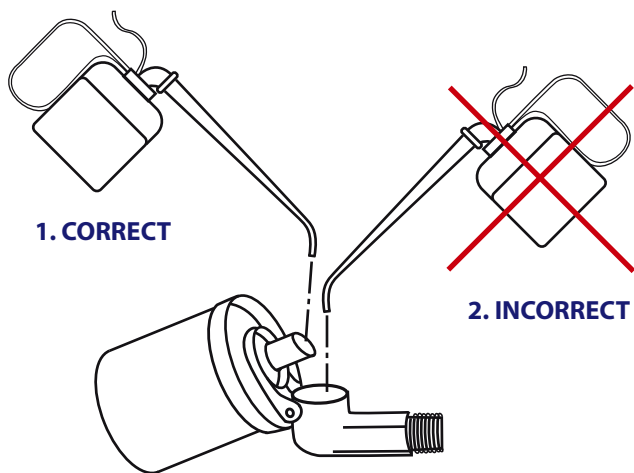
- at 40 °C ----- 143/148

- at 100 °C ----- 14.3/15.5

Viscosity index ----- 103

Flash point VO ----- > or = 215 °C

Flow point ----- > or = - 24 °C



LIST OF OTHER EQUIVALENT OILS

- ESSO ----- SPARTAN EP 150
- ELF ----- REDUCED SP 150
- TOTAL----- CARTER EP 150
- ESSO ----- OMALA EP 150

The level of use needs to be assessed by the maintenance personnel with reference to the following information:

Heavy duty:

- continuous operation (24 hours/day);
- operation in humid, dusty or chemically aggressive atmosphere;
- installation in open air;

Light-duty:

- non-continuous operation (4 hours/day or less)
- in a clean and protected environment.

Regardless of operating hours and level of use, the lubricating oil needs to be changed at least once per year.

With oil lubrication too, excess lubricant is damaging as it causes a rise in the operating temperature of the bearing and thus reduces its useful life.

In this regard, it is important that when the housing is refilled the necessary precautions are always taken to ensure that the level inside it does not exceed that maintained by the action of the constant-level oil feeder.



CAPACITY OF OIL-LUBRICATED MACHINES			
MODEL	LITER PER HOUSING	LITER PER OILER	TOTAL OF LITER PER MACHINE
77	0.67	0.11	1.56
151	0.67 or 1.67	0.11	1.56 or 3.56
251 / 400 / 500	1.91	0.11	4.04
600 / 700	5.11	0.11	10.44

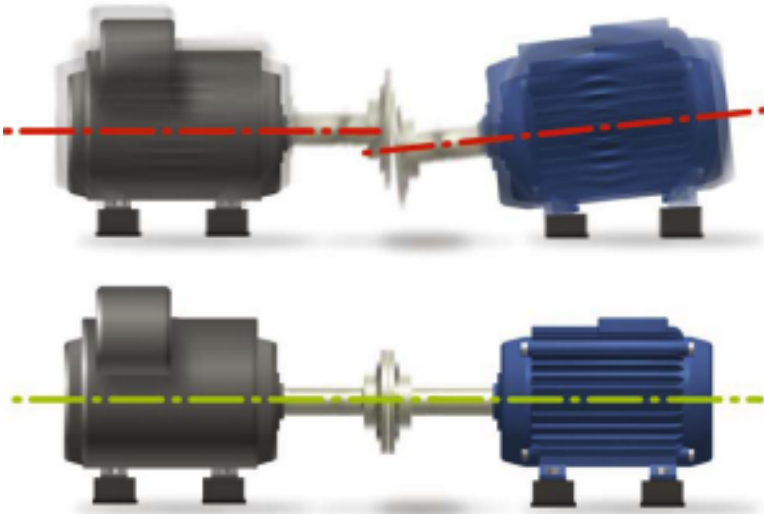
It is recommended that when filling, the same oil should be used as that used to fill the housing, to avoid the danger of mixing oils which are incompatible with each other.

Bearing housings in CONTINENTAL machines are drained after mechanical testing to prevent oil leaks during transport. The housings must therefore be refilled as described above before the machine is brought into operation for the first time.

DIRECT DRIVE ALIGNMENT

The correct alignment of the transmission coupling allows the blower to operate at minimum vibration levels and enables the useful life of the bearings to be utilized to the maximum.

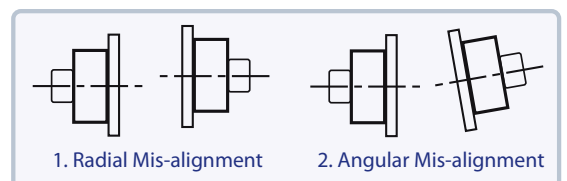
The alignment allows placing the axes of the two shafts coupled on the same vertical plane and on the same horizontal plane and keep a specified distance between the ends of the two coupled shafts.



The best method of alignment is with the laser device. Due to thermal expansion and other causes such as, for example, the lubricating oil film in the plain bearings, radial thrusts by the gears etc., the position of the two shafts coupled with the machine in normal operation can be very different from their position when the machine is off and cold.

Maximum admissible misalignment when hot can vary depending on the type of coupling; however, if no specific instructions are given, the following tolerances must be used for rotating equipment from 3000 RPM to 4000 RPM:

- radial misalignment: $\pm 0,05$ mm
- angular misalignment: $\pm 0,06$ mm
- distance between the half coupling faces DBSE: 180 mm $+0,5$ mm / -0



In resume for on inlet drive blower it is necessary to set the motor shaft lower than the blower shaft when cold in order to compensate the thermal growth in the outlet blower side.

- For the correct alignment, appropriate adjustable screw are provided in the motor and blower feet for laterally adjustment.
- For the vertical adjustment and shim under motor feet and never under blower.

The following conditions can be factors in trying to achieve good alignment for avoid vibration in the blower:

- Base frame and foundation.
- Smooth and cleaner motor and blower foot.
- Check for soft foot: When one or more feet are higher than others a soft foot condition exist and must be correct.
- Piping must be isolated using expansion joint.

SPARE PARTS

Thanks to the extreme simplicity of their design, CONTINENTAL Industrie blowers and exhausters can operate for extremely long periods before spare parts are needed. It is however advised to keep a stock of the recommended set of spare parts for keeping the machine in operation.

The damaged parts must be replaced only with original parts and by qualified and authorized personnel.

RECOMMENDED SET

The following list is with reference to standard machines.

Spare parts for any particular components and/or fittings must be provided in addition:

- bearing cover gasket
- bearing lock nut
- bearing lock washer
- bearing
- bearing housing gasket (if present)
- carbon ring housing gasket (if present)
- carbon ring (if present)
- oil feeder (if present)
- set of transmission belts (if present)

CONSUMABLES

They are restricted to :

- filter cartridges (if present)
- lubricant

ORDERING

The reference number of the spare parts can be found on the section drawing of the machine and the attached components list. When ordering, it is asked to give the serial number of the machine, found on the plate fixed to the machine itself, or any other reference to help identify it.