ALPHAIR VENTILATING SYSTEMS
1221 Sherwin Road ◆ Winnipeg, Manitoba, CANADA ◆ R3H 0V1
Tel: (204) 694-6666 ◆ Fax: (204) 694-6204
sales@alphair.mb.ca

No. 716205-165, R1

OPERATING & MAINTENANCE MANUAL
JetStream Models VAX 1800, 2100, 2700 and 3150

STORAGE AND HANDLING

RECEIVING & UNLOADING—Upon unloading this equipment, inspect it for damage. If damage has occurred, file a claim immediately against the carrier. Shortages should be reported to local sales representative or ALPHAIR at Winnipeg, Manitoba within fifteen (15) days from receipt of shipment at destination.

HANDLING—Use a sling around large fan casing, or install eye bolts in the flanges for lifting the smaller fan units. Severe impacts could distort the casing or possibly damage the bearings.

STORAGE INSTRUCTIONS — If not installed immediately, this fan should be protected to remain dry at all times.

1. Fans should be stored in a place which is clean and dry where control over temperature and rapid or extreme changes in humidity, shock and vibration are reasonably maintained as below.
2. For extended storage and negotiated extended warranty, the following instructions must be followed:

a) The storage area is to be free from any shock or vibrations of 1 mils maximum at 60 Hz, to prevent motor bearings from brinelling. Exceeding these limits will require vibration dampening material under units.

b) The storage area temperatures should not be below 50°F or over 120°F and relative humidity should be at a maximum of 60%. All units equipped with space heaters are to have the heaters connected if storage conditions exceed these environmental limits.

c) When fans are in storage longer than three (3) months, the fan rotors are to be rotated manually several revolutions at least once every three (3) months to prevent pitting of the bearing races. Rotors are to be marked so that a different blade is in the vertical position after each rotation. A small amount of grease (approximately one half (0.5) cubic inch) is to be added at the bearing grease fittings every six (6) months. This is to ensure the bearings are always coated with lubricant.

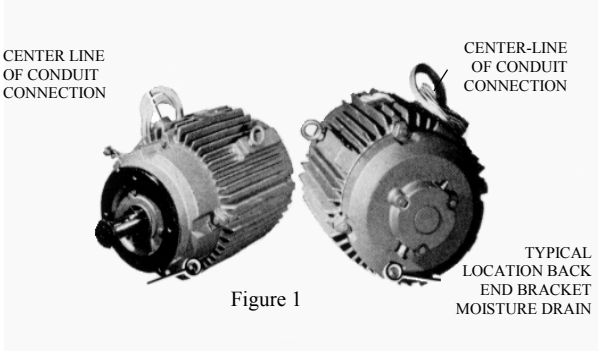

Figure 1

d) All moisture drains are to be fully operable while in storage, and/or the drain plugs removed from the motor (See Figure 1). Fan must be stored so that the drain is at its lowest point. All breathers and automatic "T" drains must be operable to allow breathing.

e) Before start up, the motor windings are to be meggared by connecting all leads together and measuring the resistance to the casing. Typically the measured value will be 30-50MΩ, and in many cases will be infinity. Under no circumstances should the motor be started if the resistance is less than:

(Nameplate volts/1000) + 1 MΩ

For 575V (Nom. 600V) the resistance will be 1.6 MΩ. Even at this value it is recommended that the motor be dried out and rechecked before start up.

WARNING TO UNLOADER, MOVER, STORAGE PERSONNEL & CONTRACTOR
FAILURE TO COMPLY WITH THESE INSTRUCTIONS COULD CAUSE SERIOUS BODILY HARM OR PROPERTY DAMAGE AND WILL VOID WARRANTY

Space heaters if fitted should be energized or a low voltage D.C supply should be put across one set of windings (e.g. from a welding supply).
3. Upon removal from storage, fan motor bearings are to be re-greased with the recommended factory lubricant.
4. For fans that are v-belt driven, be sure to take the tension off of the belts prior to storage. This is done by releasing the adjusting bolts on the motor base.
5. For units that have been installed but are not operational, disconnect ducting and cover the inlet and outlet to prevent the long term invasion of dust or water.
6. For prolonged storage, components such as damper, belts, couplings and motors should be removed and stored in a dry, well ventilated area.
7. If there are any questions concerning the recommended procedure contact our service department in Winnipeg.

INSTALLATION AND START-UP

INSTALLATION—All supporting points must be uniformly located so there is no twisting or distortion through the fan unit. Also, the intake should be carefully arranged to direct a smooth and uniform air flow into the fan rotor.

START-UP—Before start-up, be sure the rotor turns freely and all material has been removed from duct or the area in front of the fan intake. The rotor should rotate counterclockwise when looking into intake. As soon fan is up to speed, check the motor amperage on each phase for balance and correct motor load. The full load amps are stamped on the fan nameplate, which is located on the outside of the fan casing, and must not be exceeded.

BLADE ANGLE—On all fans the blade angle have been set at the factory for duty required. The blade angle range is numbered from 1 to 9. As, the blade angle increases, the flow, pressure and horsepower are increased. In order to determine the correct blade setting for a given blade tip angle, refer to the "Blade Setting Cross - Reference" chart, located in the Technical Section of the fan performance catalogue.

To adjust the blades, the following procedure should be used:

a) Mark the nose cap relative to the hub and mark fasteners and extra washers (trim balance weights). Remove the cap and store fasteners and washers.
b) Loosen the blade locknut.
c) The ideal method for establishing the correct blade angle is by using a protractor to measure the nose to tail angle at the tip of the blade. The numbered blade angle settings have been provided for convenience and allow for a working approximation of the blade angles.
d) Tighten the locknut to 120 ft-lb while holding the blade to make sure the position does not change.
e) After setting all blades, check all blade position to make sure they are all identical.
f) Replace the nose cap by matching it's mark and the hub mark and replace the fasteners and washers at the same locations.

After each adjustment, turn rotor by hand to make sure blades are not striking the casing or motor support. If blade angle is increased check motor amperage immediately after start up. Values may not exceeded those specified on the motor name plate.

V-BELT DRIVES—V-belt driven fans that are shipped assembled are factory aligned. However, it is recommended that drive is checked at start up as follows:

a) Be sure sheaves are locked in position.
b) Check that keys are firmly seated in the keyways.
c) Start the fan and check for proper rotation. Run fan at full speed. A slight bow should appear on slack side of the belt (all the belts must have slack on one side).
d) To tension belt properly adjust motor on its sliding base being careful to retain alignment of sheaves.

If belts squeal at startup, apply more tension to belt(s).

BALANCE—The fan was operated and dynamically balanced to a precise degree during assembly. This balance must always be maintained to assure long, faithful service. If operation is not smooth, contact our Fan Field Service Department at Winnipeg, Manitoba, Canada, advising fan serial number (stamped on the nameplate) and the fan model number.

ALPHAIR standard vibration velocities (ISO STD 2372) are :

SMOOTH RUN	ALARM	SHUT DOWN
0.08in/s (2mm)	0.23in/s (6mm)	0.4in/s (10mm)

DISMANTLING INSTRUCTIONS

ROTOR REMOVAL—Gain access to the inlet of the fan with a minimum of one fan diameter. After this is done, the following steps should be followed:

a) Mark the nose cap relative to the hub and mark fasteners and extra washers (trim balance weights). Remove the cap and store fasteners and washers.
b) If the fan is equipped with taperlock bushing remove capscrews from the bushing insert them in tapped holes in bushing flange. Tighten progressively until bushing disengages. Pull the complete rotor assembly from the shaft.

If the fan is equipped with locknut then remove the large nut holding the rotor to motor or fan shaft. Use puller tool (if necessary) and tapped holed in the insert, pull the rotor of the shaft.

c) If the rotor blades are worn or broken, all blades should be replaced.

d) After disassembly, inspect all parts and replace any which are excessively worn.

BELT DRIVE REPLACEMENT

a) Loosen the clamping bolts on sides of the motor support. Move motor on slide base so belts can be placed in grooves of both sheaves without forcing. Do not roll belts or use a tool to force belts over the grooves.

b) Adjust fan and motor shafts so they are parallel using a straight edge or taut cords. Belts should be at right angles to the shafts. Improper alignment causes excessive belt wear.

c) Before putting belts on, check for correct direction of motor rotation.

d) Tighten belts by sliding motor in its base. Be sure to re-tight clamping bolts on the side of support. Correct tension gives the best drive efficiency. Excessive tension causes undue bearing loading. Recheck alignment.

e) Start the fan and run at full speed. Adjust belt tension until only a slight bow appears on the slack side of the belts. If slippage occurs, a squeal will be heard at startup. Eliminate by tightening the belts.

f) Give belts a few days running time to become seated in sheave grooves - then readjust belt tension.

LUBRICATION - GENERAL

Good preventative maintenance requires that the above lubrication practices be followed as well as giving attention to cleanliness. Use only the recommended lubricant and follow the schedules listed. In some cases special lubricants or frequency of lubrication will be required. These will be found on an instruction plate on the fan itself.

Cleanliness is important in lubrication. Grease guns and fittings should be clean to prevent contaminants from being pumped into the bearing. If the Fan is handling contaminated air, the rotor should be disassembled and cleaned periodically the frequency dependent on the degree of contamination.

From the lubrication schedules furnished determine the time period for lubrication and establish a schedule to grease with the recommended lubricant at theses periods. Use a hand operated grease gun only. DO NOT OVERGREASE. Greasing may be carried out with the fan running or stationary.

All bearing cavities and grease leads have been properly filled by ALPHAIR prior to shipment. Fans which are to be started within three (3) months of delivery require no further attention until the first periodic lubrication as established from the following schedule

LUBRICATION OF MOTORS

MOTORS furnished in all ALPHAIR Jet Streams fans have been lubricated with Shell Cyprina RA/C3 grease and it is recommended that the customer continue to use lubricant in future lubrications. If this grease cannot be obtained, the only other suggested lubricant are:

OPERATING TEMP.: -25°C (-15°F) to 50°C (120°F)

TEXACO, INC	PREMIUM RB
GULF OIL	EP2
ESSO	UNIREX EP2

MINIMUM STARTING TEMP.: -75°C (-100°F)

SHELL OIL CO.	AEROSHELL #7

Up to 215T frame motors are assembled with sufficient grease in bearing cavities to lubricate bearings for life. Therefore, no grease fittings are provided on these motors.

Some high horsepower motors have special bearings. These fans have a motor lubrication plate mounted on the outside of the fan near one of the grease fittings. Follow the instructions on this plate in lieu of the standard instructions printed here.

Using a hand operated grease gun only, pump in the following recommended grease volume:

Re-lubrication quantity.

FRAME SIZE	CONDITIONS[1]	CONDITIONS[2]
182 THRU 215	1.0 cu. in.	0.75 cu. in.
254 THRU 286	2.0 cu. in.	1.5 cu. in.
324 THRU 365	3.0 cu. in.	2.0 cu. in.
404 THRU 449	4.0 cu. in.	3.0 cu. in.

[1] **STANDARD CONDITIONS**: Eight hours per day, normal or light loading, clean and 40 °C (100 °F) maximum ambient temperature.

[2] **SEVERE CONDITIONS**: Twenty-four hours operation or shock loading, vibration, or in dirt or dust at 40-50 °C (100-120 °F) ambient temperature.

MOTOR	STANDARD	SEVERE

Lubrication frequency per the following schedule:

HORSEPOWER	STANDARD CONDITIONS	SEVERE CONDITIONS
1 thru 7-1/2 1800 RPM and slower	3 years	1 year
10 thru 75	3 years	6 to 12 months
1800 RPM and slower		
100 thru 75 1800 RPM and slower	1 year	6 months
All over 1800 RPM	6 months	3 months

BEARINGS LUBRICATION

BELT DRIVE FANS are equipped with Link-Belt Spherical Roller Bearing Units - Series B22400H, or 22500H and Self-Aligning Ball Bearings - Series 300, depending on the fan shaft diameter. Extended grease leads are brought to the outside of the fan casing. Lubricate with NLGI2 or 3 grade multi-purpose bearing grease. A minimum base oil viscosity of 500 SUS at 100°F (100 cSt at 40°C) and be suitable to operate continuously at 225°F (107°C). Suggested alternative greases are:

SHELL ALVANIA GREASE 2 OR 3
GULFCROWN GREASE NO. 2 OR NO. 3
TEXACO 1939 PREMIUM RB
AMOCO RYKON PREMIUM GREASE NO.2

Grease per the following schedule:

Grease Lubrication Schedule for Series 300 -Self-aligning Ball Bearing

Relubrication Interval				6 months	4 months	2 months	1 month
Shaft size range		Amount of		Operating speed (rpm)			
Inches	MM	IN^3	CM^3	Up to	Up to	Up to	Up to
3/4-1	20-25	0.3	4.1	2800	4400	5400	8400
1-1/16 -1 7/16	30-35	0.7	10.7	2000	3100	4500	6000
1 1/2 - 1 3/4	40-45	1.0	16.4	1500	2400	3500	4600
1 15/16 -3/16	50-55	1.7	28	1200	2000	2900	3800
2 1/4 - 2 7/16	60	2.1	34	1100	1800	2600	3500
2 11/16 - 2 15/16	70-75	3.3	54	900	1400	2100	2800
3 - 3 3/16	80	4.5	74	800	1300	2000	2600
3 7/16 - 3 7/8	85	6.6	108	800	1200	1800	2400
3 15/16	100	10	170	700	1100	1600	2100

Grease Lubrication Schedule for Series B22400H and B22500H -Spherical Roller Bearing

Relubrication Interval				6 months	4 months	2 months	1 month
Shaft size range		Amount of		Operating speed (rpm)			
Inches	MM	IN^3	CM^3	Up to	Up to	Up to	Up to
3/4-1	25	0.4	6.4	1400	2200	5000	6800
1-1/16 -1 1/4	30	0.5	7.7	1150	1800	4500	5600
1 5/16 - 1 1/2	35	0.6	9.2	1000	1550	3800	4800
1 9/16 - 1 3/4	40	0.8	13.1	870	1350	3300	4200
1 13/16 - 2	45-50	0.9	14.6	700	1100	2700	3400
2 1/16 - 2 1/4	55	1.1	17.9	630	1000	2400	3000
2 5/16 - 2 1/2	60	1.3	21	580	910	2250	2800
2 9/16 - 3	65-75	2.4	40	460	730	1800	2200
3 1/16 - 3 1/2	80-85	3.9	64	410	640	1550	2000
3 9/16 - 4	90-100	5.7	94	350	550	1350	1700
4 1/16 - 4 1/2	110-115	6.5	106	300	470	1150	1500
4 9/16 - 5	125	10.0	164	280	440	1050	1400

WARNING

Mixing lubricant is not recommended due to possible incompatibility. DO NOT substitute other manufacturing brands without first consulting our factory. Care must be taken to look for signs of lubricant incompatibility, such as extreme soupiness visible from the grease relief area.