STERLING SYSTEMS

A Division of The Sterling Blower Company

Blower
Service & Operation Manual

To be filled in by Maintenance Personnel:

Blower Serial Number(s): _____

IMPORTANT:

Operating and Maintenance personnel must be thoroughly familiar with the contents of this manual prior to operating or servicing this piece of equipment. Injury to personnel or damage to equipment could occur from improper operation.

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Section I
General Safety Rules

This equipment has been constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of unit. All personnel using this equipment should become familiar with its operation as described in this manual.

Air-moving equipment involves moving parts, electrical wiring, and air velocity/pressure which can contribute to safety hazards if installation, operation, and maintenance of this equipment is not properly performed. To minimize this danger, follow all instructions and warnings.

1. Every motor-driven blower should have a separate disconnect switch to isolate it from the electrical supply. There should also be a means of locking out the equipment by maintenance personnel while servicing the unit.

2. For all repairs, replacements, or servicing, turn off power at all sources of electrical and pneumatic supply before servicing unit.

3. Special caution must be observed around blower inlets as the suction can pull items such as clothing, jewelry, and tools into the blower. Inlets and outlets that are not physically connected to pipe or tubing should be covered with a screen to prevent any foreign objects from entering the airstream.

4. All moving parts should have guards to protect personnel from injury. Be sure all covers and guards are in position and securely fastened before operating equipment. Check often for damaged or missing guards and replace them immediately.

5. Before servicing the unit, turn off the power and make sure that the impeller has come to a complete stop.

6. Do not operate equipment at speeds higher than that for which the equipment is rated. Consult factory before increasing blower speeds.

7. If electrical interlocks are included, under no circumstances should they be bypassed or disabled.

Section II
Installation

2.0 Introduction

This section provides the instructions for the installation and setup of the equipment you have purchased from Sterling Blower Co. It does not include any provisions for any special accessories or optional equipment.

2.1 Description

The equipment supplied by Sterling Blower Co. is a result of the customized engineering, manufacturing know-how, and quality craftsmanship that have made Sterling the highly efficient, cost-effective solution to your material handling needs.

2.2 Handling and Storage

It is the responsibility of the customer to handle the equipment in a manner that is safe to personnel and not damaging to the equipment. The preferred method for handling the blower is to lift from underneath the base plate.

If equipment is not to be installed immediately, it should be stored in a clean, dry location to prevent rust from forming on steel components. If storing equipment outdoors, cover all inlets, outlets, motors, and bearings to keep dirt and moisture out.

2.3 Equipment Specifications

A. Floor Space Requirements

Refer to the General Arrangement (GA) drawing in this manual for floor space requirements for the blower you have purchased. The working area around the blower should be free of loose items laying around. If a sound enclosure is included, add at least 8” to the base plate perimeter dimensions for clearance.

B. Lagging Requirements

It is recommended that all equipment be lagged down to the floor to prevent “walking” caused by vibration and to avoid the possibility of the unit from accidentally being knocked out of place.

The best conditions for installing a floor-mounted blower is to have a properly designed, level concrete foundation. Holes are provided on equipment for the purpose of lagging it to the floor. Hammer-drilled expansion fasteners can be used to lag the unit down. It is

recommended that all equipment and tubing be in place before lagging any equipment to the floor.

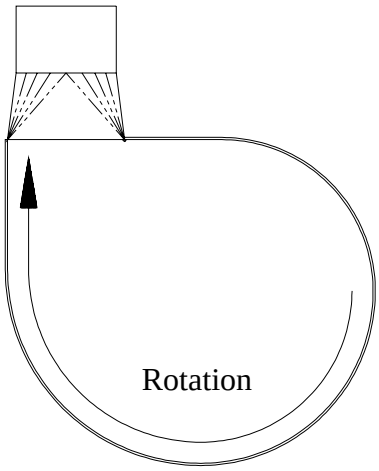
If the unit is being mounted on an elevated surface, it must be supported in a manner that will adequately support the weight of the unit and prevent it from swaying.

2.4 Wiring Instructions

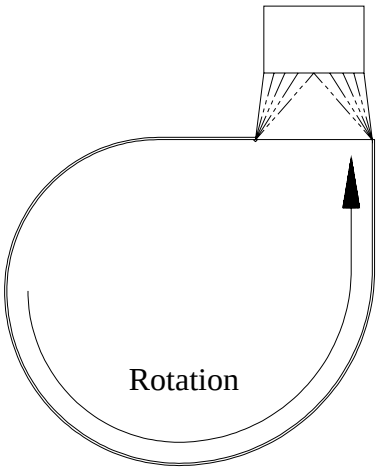
Refer to the wiring diagram on the motor nameplate for wire connections. *(For the EZ-AC models, one (1) of the three (3) power wires must be connected through the electrical interlock).* Check the line voltage frequency and phase, being sure that it agrees with the data on the nameplate. Grounding and fusing should be done in accordance with the National Electrical Code.

Jog the motor by turning the power to the blower ON and then immediately turning it OFF. This will start the motor for a few seconds. While the motor is still turning, look into the rear of the motor and verify that it is turning in the desired direction. The rotation should be such that the resulting rotation of the wheel inside the housing is the same as shown by the rotation direction sticker (arrow) on the blower. The rotation of the blower wheel must move air/material tangentially into the blower outlet (see Fig. 1 below).

If the motor is turning in the wrong direction, turn off the power supply and disconnect the incoming power supply. Reverse any two of the three line connections to the blower motor. Reconnect the incoming power supply line and jog the motor again for rotation verification.



CW (clock-wise) rotation



CCW (counter clockwise) rotation

Fig. 1
Note: Housings are viewed from drive side.

2.5 Electrical Interlock Interface (for EZ-AC models only)

IMPORTANT: *This equipment contains **electrical interlocks!!** For your safety and the safety of those that will be operating the machinery which contains the interlocks, the following guidelines must be adhered to:*

• Under no circumstance are the interlocks to be bypassed or disabled.

• These interlocks are intended to be used in the machinery control circuit.

• The interlocks should be wired in such a manner that the disengagement of the interlock will stop and/or prevent the operation of any equipment that may cause personal injury as a result of removing the cover, guard, or other device that the interlock is governing.

Please contact the factory if further assistance is needed on this matter.

INSTALLATION — MAINTENANCE INSTRUCTIONS
AC INDUCTION MOTORS

INSTALLATION

After unpacking, check for damage. Be sure that the shaft rotates freely.

MOUNTING

Mount motors securely on a firm foundation. Ball bearing motors can be mounted in any position.

CONNECTIONS

Check line voltage frequency and phase, being sure that it agrees with the nameplate. Grounding and fusing should be done in accordance with National Electrical Code. See connection diagram on the nameplate of the motor.

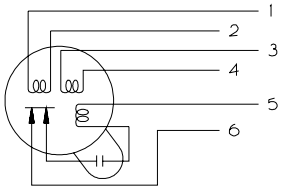
RECOMMENDED COPPER WIRE & TRANSFORMER

	SINGLE PHASE MOTORS — 230 V0LTS					
	TRANSFORMER	DISTANCE — MOTOR TO TRANSFORMER IN FT.				
H.P.	KVA	100	150	200	300	500
1½	3	10	8	8	6	4
2	3	10	8	8	6	4
3	5	8	8	6	4	2
5	7½	6	4	4	2	0
7½	10	6	4	3	1	0

		THREE PHASE MOTORS — 230 & 460 V0LTS					
		TRANSFORMER	DISTANCE — MOTOR TO TRANSFORMER IN FT.				
H.P.	VOLTS	KVA	100	150	200	300	500
1½	230	3	12	12	12	12	10
1½	460	3	12	12	12	12	12
2	230	3	12	12	12	10	8
2	460	3	12	12	12	12	12
3	230	5	12	10	10	8	6
3	460	5	12	12	12	12	10
5	230	7½	10	8	8	6	4
5	460	7½	12	12	12	10	8
7½	230	10	8	6	6	4	2
7½	460	10	12	12	12	10	8
10	230	15	6	4	4	4	1
10	460	15	12	12	12	10	8
15	230	20	4	4	4	2	0
15	460	20	12	10	10	8	6
20	230		4	2	2	1	000
20	460		10	8	8	6	4
25	230		2	2	2	0	000
25	460	CONSULT	8	8	6	6	4
30	230		2	1	1	00	0000
30	460	LOCAL	8	6	6	4	2
40	230		1	0	00	0000	300
40	460	POWER	6	6	4	2	0
50	230		1	0	00	0000	300
50	460	COMPANY	4	4	2	2	0
60	230		1	000	000	250	500
60	460		4	2	2	0	00
75	230		0	000	0000	300	500
75	460		4	2	0	00	000

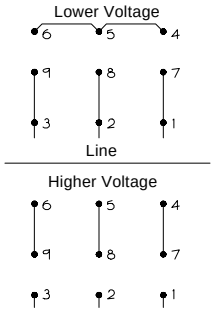
CONNECTION DIAGRAMS

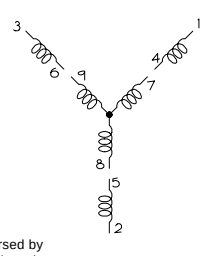
DIAGRAM CD0001
Single Phase — Dual Voltage — Reversible



	LINE A	LINE B		LINE A	LINE B	TOGETHER
LOW STD.	1, 3 & 8	2, 4 & 5	HI STD.	1	4 & 5	2, 3 & 8
LOW OPP.	1, 3 & 5	2, 4, & 8	HI OPP.	1	4 & 8	2, 3 & 5

DIAGRAM CD0005
3 Phase — 9 Lead Motor





Rotation is reversed by reversing any two line wires.

Section III
Operation

3.0 Introduction

This equipment is designed and built for maximum operator safety when used under standard conditions. All operators of this equipment should read and become familiar with all safety rules and instructions in this manual.

3.1 Start-Up

Disconnect power and inspect the blower prior to start-up to be certain that no foreign objects have fallen into the blower housing. Turn the wheel by hand to check for binding or resistance.

Make sure that the motor has adequate air ventilation (clearance) to prevent overheating during operation.

Check all hardware, making sure that everything is tightly secured.

Check pillow block bearing screw and bearing mounting screws (See Section 4.2 for torque requirements). Note: you will need to remove the shaft guard to perform this check.

Check belt tension (see Section 4.1, B.1, “Installing/Tensioning V-Drives), if applicable.

Make sure all guards and safety equipment are in place and securely fastened.

Check all tubing connections to and from the blower making sure that all connections are tightly secured.

Have a qualified electrician verify that supply voltage to the motor is correct and wiring has been done properly.

Jog the starter to verify proper wheel rotation. If rotation is incorrect, reverse wiring to correct it (see Sect. 2.4).

Turn power on and check for any unusual sounds or excessive vibrations. If any are present, refer to Section 4.3, Trouble-Shooting.

Note: Shut the blower down immediately if any sudden increase in vibration occurs.

Allow the blower to run up to speed for at least 30 seconds on start-up prior to feeding material through the blower (if applicable).

3.2 Operation

Do not operate equipment at speeds higher than that for which the equipment is rated. Consult factory before increasing blower speeds.

If material is being conveyed by the blower, caution must be used to insure that the blower is not conveying more throughput (lbs/hr) than that for which it has been sized.

No inlet or outlet tubing should be removed while the blower is in operation as serious injury could result

3.3 Shut-Down

In order to prevent any buildup of material in any of the conveying lines, the blower should be allowed to run approximately five (5) minutes after all other major equipment (granulator, etc.) has been turned off.

To clean out or inspect inside the blower, it is *not* necessary to disconnect any tubing. Turn off power to the blower. Start turning the latch bolt knob counter clockwise and allow approximately three (3) minutes for the impeller to come to a complete stop. Remove the latch bolt and place in a safe place. Be sure the impeller has stopped and swing the door open. Reverse procedure for closing the door.

Section IV
Maintenance

4.0 Introduction

A good maintenance program should consist of a systematic check of all blower parts on a regular basis. Maintenance intervals should be determined by the severity of the application and local conditions. Do not attempt any maintenance or servicing of equipment until electrical power supply has been disconnected and locked out.

4.1 Preventative Maintenance

Proper preventative maintenance will ensure a long and trouble-free service life. Regular blower maintenance should include the following:

A. Motor

A1. Lubrication Instructions for Ball Bearing Motors

1. No lubrication needs to be added before start-up. The bearings have been lubricated at the factory.

2. Relubrication Intervals — Use Shell Dollum R Polyurea type grease or equivalent compatible grease. The following intervals are suggested as a guide:

Hours of Service per year	HP range	Suggested relube interval
5,000	1/8 to 7½ 10 to 15	5 years 3 years
Continuous Normal Applications	1/8 to 15	1 year
Seasonal Service Motor is idle for 6 months or more	All	1 year (beginning of season)
Continuous High Ambients, Dirty or Moist locations, High Vibrations or where Shaft End is Hot (Pumps-Fans)	1/8 to 15	6 months

*Consult motor manufacturer for HP's other than those shown.

B. Belts and Sheaves (on V-Belt Drive models)

Sterling uses Gates Type 3VX belts. Check the V-Belt drive (if blower is V-Belt type) for proper alignment and tension (see section B.1 titled "Installing/Tensioning V-Drives"). If belts are worn, replace them as a set, matched to within manufacturer's tolerances. If just one belt is added to a set of used belts, the new belt will ride higher in the sheave, travel faster, and have a higher tension that the used belts. This can elongate the new

belt, rendering it useless.

Dirty or rusty sheaves impair the drive's efficiency and cause excessive wear to the belts, which can result in premature failure. Worn sheaves shorten belt life by as much as 50%. If the grooves are worn to the point that the belt bottoms out, slippage may occur and burn the belts. If the sidewalls are "dished out," the bottom shoulder ruins the belt prematurely by wearing out the bottom corners.

Sheave alignment should be checked by placing a straightedge across the sheave faces so that it touches all four points of contact. Usually, a misalignment of more that one-half of one degree (one-eighth inch in one foot) will adversely affect belt life. Improper sheave alignment produces uneven wear on one side of the belt, causing the belt to roll over in the sheave, or throwing all of the load on one side of the belt, stretching or breaking the cords on that side.

B.1 Installing / Tensioning V-Drives

1. Installing a Drive

Check Condition of Sheaves — Before a new set of V-Belts are installed, check the condition of the sheaves. Dirty or rusty sheaves impair the drive's efficiency and abrade the belts, which result in premature failure.

Worn sheaves can shorten the belt life as much as 50%. If the grooves are worn to where the belt bottoms, slippage may result and burn the belts. If the sidewalls are "dished out," the bottom shoulder ruins the belt prematurely by wearing off the bottom corners.

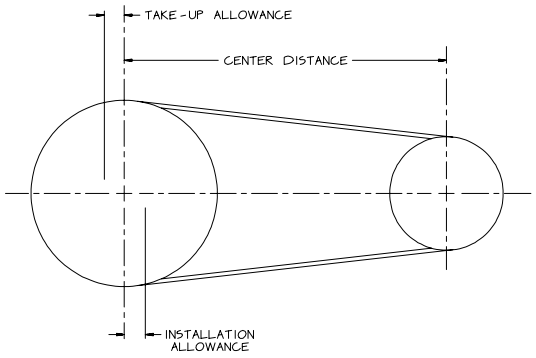
Check Sheave Alignment — Sheave adjustment should be checked by placing a straight edge or tight cord across the sheave faces so that it touches all four points of contact. Ordinarily, a misalignment of more that one-half of one degree (one-eighth inch in one foot) will adversely affect belt life. Improper sheave alignment produces uneven wear on one side of the belt, causes the belt to roll over in the sheave, or throws all the load on one side of the belt, stretching or breaking the cords on that side.

2. Installation and Take-up Allowances

After calculating a center distance from a standard pitch length, make provision for adjusting the center distance as in Fig. 2 below, to allow for installation of the belts without injury, for tensioning, and for maintenance of proper tension throughout the life of the belt. (Refer to Table 2 for values).
Placing Belts on Sheaves — Shorten the center distance of the drive until the belts can be put on the sheaves without forcing. Forcing the belts can cause internal injury to the belts.

Belt Selection — For maximum service, replace V-belt drives with a

Fig. 2



complete new matched set of belts.

Never employ a used belt as a replacement for a unit of a set. Used belts, normally, are worn in cross-section and stretched. A new belt so applied will ride higher in the sheave, travel faster and operate at a much higher tension than the used belts. The cord center may be ruptured, allowing the new belt to elongate. Shortly after this occurs it will cease to accept its full share of the load, leaving the drive under-belted. Thus, the new belt is wasted. Belts of different manufacturers should not be mixed for the same reasons.

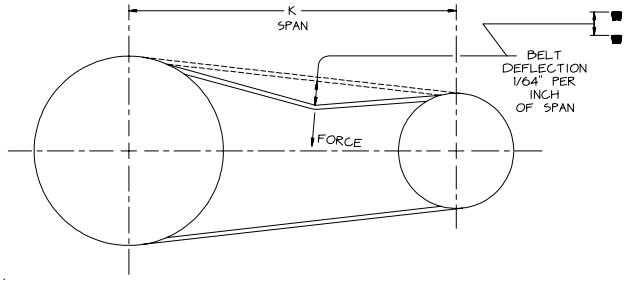
3. Tensioning a Drive

General Rules of Tensioning —

1. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
2. Check tension frequently during the first 24-48 hours of run-in operation.
3. Over-tensioning shortens belt and bearing life.
4. Keep belts free from foreign material which may cause slip.
5. Make V-drive inspection on a periodic basis. Tension when slipping. Never apply belt dressing as this will damage the belt and cause early failure.

Simple Tensioning Procedure

Fig. 3



1. Measure the span length, K (see Fig. 3 below)
2. At the center of the span (K), apply a force (perpendicular to the span)

large enough to delfect the belt 1/64" for every inch of span length. For example, the deflection of a 100-inch span would be 100/64 or 1 9/16 inches.

3. Compare the force you have applied with the valves given in Table 1. If the force is between the values for normal tension, and 1½ times normal tension, the drive tension should be satisfactory. A force below the value for normal tension indicates an undertensioned drive. If the force exceeds the value for 1½ times normal tension, the drive is tighter than it needs to be.

After the proper operating tension has been applied to the belts, a double-check should be made of the following:

a. Parallel position of the sheave shafts.
b. Correct alignment of sheave grooves.

Table 1
Belt Deflection Forces

Belt Sect.	Small Sheave Diameter Range	Belt Deflection Force		
		RPM Range	Normal	New Belt
3VX	2.65-3.65	1000-2500	3.6	5.1
		2501-4000	3.0	4.4
	4.12-6.90	1000-2500	4.9	7.3
		2501-4000	4.4	6.6

Table 2
Center Distance Allowance for Narrow
Belt Installation and Take-up

Nom. Belt Length in Inches	Min. Installation Allowance (Below Center)						Min. Take-up Allowance (Above Center)
	3V Dyna-V	3V Poly-band	5V Dyna-V	5V Poly-band	8V Dyna-V	8V Poly-band	
Up to & incl. 47 1/2	1/2"	1 7/32"	----	----	----	----	1"
50-71	13/16"	1 13/32"	1"	2 7/64"	----	----	1 13/64"
75-106	13/16"	1 13/32"	1"	2 7/64"	1 1/2"	3 13/32"	1 1/2"
112-125	13/16"	1 13/32"	1"	2 7/64"	1 1/2"	3 13/32"	1 13/16"
132-170	13/16"	1 13/32"	1"	2 7/64"	1 1/2"	3 13/32"	2 13/64"
180-200	----	----	1"	2 7/64"	1 13/16"	3 39/64"	2 1/2"
212-236	----	----	1 7/32"	2 13/32"	1 13/16"	3 39/64"	3"
250 and 265	----	----	1 7/32"	2 13/32"	1 13/16"	3 39/64"	3 13/64"
280 and 300	----	----	1 7/32"	2 13/32"	1 13/16"	3 39/64"	3 1/2"
315-355	----	----	1 7/32"	2 13/32"	2"	4"	4"
375	----	----	----	----	2"	4"	4 1/2"
400-560	----	----	----	----	2"	4"	5 1/2"

MORE POWER AND LIFE FROM V-BELTS

	Trouble Area and Observation	Cause	Remedy
Belt Stretch Beyond Take-up	Belts stretch unequally.	Mis-aligned drive, unequal work done by belts.	Realign and re-tension drive.
	All belts stretch about equally.	Belt tensile member broken from improper installation.	Replace all belts with new matched set, properly installed.
		Insufficient take-up allowance.	Check take-up and follow allowance.
		Greatly overloaded or underdesigned drive.	Redesign.
Short Belt Life	Relatively rapid failure: no visible reason.	Tensile members damaged through improper installation.	Replace all belts with new matched set, properly installed.
		Worn sheave grooves (check with groove gauge).	Replace sheaves.
	Sidewalls soft and sticky. Low adhesion between cover plies. Cross-section swollen.	Under-designed drive.	Redesign.
		Oil or grease on belts or sheaves.	Remove source of oil or grease. Clean belts and grooves with cloth moistened with alcohol.
	Sidewalls dry and hard. Low adhesion between cover plies. Bottom of belt cracked.	High temperatures.	Remove source of heat. Ventilate drive better.
	Belt(s) turned over in grooves	Excess lateral belt whip.	Use Banded belt.
Belt Turnover		Foreign material in grooves.	Remove material — shield drive.
		Mis-aligned sheaves.	Realign the drive
		Worn sheave grooves (check with groove gauge).	Replace sheave.
		Tensile member broken through improper installation.	Replace all belts with new matched set, properly installed.
		Incorrectly placed flat idler pulley.	Carefully align flat idler on slack side of drive as close as possible to drive sheave.
Deterioration of Rubber Compounds Used in Belt	Extreme cover wear.	Belt dressing.	Never use dressing on V-Belts. Clean with closth moistened with alcohol. Tension drive properly to prevent slip.
	Spin burns on belt.	Belts rub against belt guard or other obstruction.	Remove onstruction or align drive to give needed clearance.
	Bottom belt cracked.		Tighten drive until slipping stops.
	Broken belts.	Belts slip under starting or stalling load.	
		Too small sheaves.	Redesign for larger sheaves.
		Object falling into or hitting drive.	Replace all belts with new matched set, properly installed.
Improper Driven Speed	Incorrect driveR-driveN ratio.		
	Spin burns on belt.	Design error.	Use correct sheave sizes.
		Belt slip.	Re-tension drive until it stops slipping.
Belt Noise	Noise generated from belts turning	Belt slip.	Re-tension drive until it stops slipping.
	Drive over-tensioned.	Worn grooves - belts bottoming and will not transmit power until over-tensioned.	Replace sheave. Tension drive properly.
Hot Bearings	Sheaves too small.	Improper tensioning.	Re-tension drive.
		Motor manufacturer’s sheave diameters not followed.	Redesign drive.
	Poor bearing condition.	Underdesigned bearing or poor bearing maintenance.	Observe recommended bearing design and maintenance.
	Sheaves out too far on shaft.	Error or obstruction problem.	Place sheaves as close as possible to bearings. Remove any obstruction preventing this.
	Drive under-tensioned.	Belt slipping and causing heat build-up.	Re-tension drive.

C. Bearings (on V-Belt Drive models)

WARNING! *To ensure that the drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.*

Sterling uses Dodge® SC or SCM Bearings in its blowers. If the blower is to be exposed to wet or dusty conditions or to corrosive vapors, extra protection is necessary: Add grease until it shows at the seals; rotate the bearing to distribute grease; cover the bearing. After storage or idle period, add a little fresh grease before running.

High Speed Operation — In the higher speed ranges too much grease will cause overheating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience — see "Operating Temperature" below. If excess grease in the bearing causes overheating, it will be necessary to remove grease fitting to permit excess grease to escape. The bearing has been greased at the factory and is ready to run. When establishing a relubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

Operating in Presence of Dust, Water, or Corrosive Vapors —Under these conditions the bearing should contain as much grease as speed will permit since a full bearing with consequent slight leakage is the best protection against entrance of foreign material. In the higher speed ranges too much grease will cause overheating — see "High Speed Operation" above. In the lower speed ranges it is advisable to add extra grease to a new bearing before putting into operation. Bearings should be greased as often as necessary (daily if required) to maintain a slight leakage at the seals.

Normal Operation — The following table is a general guide for relubricatable bearings. However, certain conditions may require a change of lubrication periods as dictated by experience. See "High Speed Operation" and "Operation in Presence of Dust, Water or Corrosive Vapors" above.

Lubrication Guide
Read preceding paragraphs before establishing lubrication schedule

Hours Run per Day	Suggested Lubrication Period in Weeks							
	1 to 250 RPM	251 to 500 RPM	501 to 750 RPM	751 to 1000 RPM	1001 to 1500 RPM	1501 to 2000 RPM	2001 to 2500 RPM	2501 to 3000 RPM
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	1	1
24	10	5	3	2	1	1	1	1

Operating Temperatures — Abnormal bearing temperatures may indicate faulty lubrication. Normal temperature may range from "cool to warm to the touch" up to a point "too hot to touch for more that a few seconds," depending on bearing size and speed and

surrounding conditions. Unusually high temperature accompanied by excessive leakage of grease indicates too much grease. High temperature with no grease showing at the seals, particularly if the bearing seems noisy, usually indicates too little grease. Normal temperature and a slight showing grease at the seals indicate proper lubrication.

Kind of Grease — Many ordinary cup greases will disintegrate at speeds far below those at which DODGE bearings will operate successfully if proper grease is used. DODGE bearings have been lubricated at the factory with No. 2 consistency lithium base grease which is suitable for normal operating conditions. Relubricate with lithium base grease or a grease which is compatible with original lubricant and suitable for ball bearing service. In unusual or doubtful cases, the recommendation of a reputable grease manufacturer should be secured.

D. Wheel

Airstreams often carry material that can cause abrasion or corrosion of blower parts. This wear is often uneven and will vary according to the type and amount of material being conveyed and the type of wheel being used in the blower. While most wheels stay in service for a number of years, they should be inspected periodically for wear or structural damage that could cause a costly failure. Wear will also throw the wheel out of balance.

If wheels start to show premature wear, contact the Sterling sales department as soon as possible for recommendations.

4.2 Corrective Maintenance

A. Wheel Replacement

Caution!! Tag and lock out power supply to the blower!!

Remove the inlet plate from the blower by removing the hardware from the studs that are welded to the housing. If you have a V-Belt drive blower, you must also remove the hardware that attaches the foot of the inlet plate to the base plate. The inlet plate may have to be gently pried loose because of the silicone sealant between plates. This sealant should be scraped off and new silicone reapplied when putting the inlet plate back on to insure proper seal.

Note: The blower housing may be removed if additional access to the set screws in the wheel hub is needed.

Loosen the set screws in the wheel hub. Pull wheel off of the shaft. Retain the key stock when removing the wheel. Slide the new wheel onto the shaft. Leave a 1/8" clearance between the back plate of the wheel and the inside of the motor plate. Keep in mind that additional clearances will be needed if any weights are welded on the back plate of the wheel (for balancing).

Install the key stock into the keyways on shaft and wheel hub. Apply “Loctite Screw Lock” onto threads of the set screws in wheel hub and tighten screws onto the shaft after double-checking that the wheel is in the proper location on the shaft. It is recommended that the set screws over the keystock be tightened first. Turn the wheel by hand to visually check that it does not wobble as it rotates.

B. Drive Belt Replacement (on V-Belt Drive models)

Loosen the four (4) bolts that connect the motor base to the motor base slide frame. Turn the adjustment screw(s) on the motor base to loosen the tension on the belt(s). Remove the worn belts from around sheaves.

Always replace the belts as a set. Refer to the section titled “Installing/Tensioning V-Drives” (section B.1) for instructions on installing new belts. Apply tension needed by turning the adjustment screw(s) on the motor base slide frame. Excess tension shortens bearing life while insufficient tension shortens belt life and can reduce blower performance and efficiency. After proper tension is acquired, retighten the four bolts on the motor base, as some stretching may occur in the belts after installation. Belt tension should be checked periodically.

C. Sheave Replacement (on V-Belt Drive models)

Sheaves need to be replaced if they have become worn or damaged. Dirty or rusty sheaves can impair the drive’s efficiency. Remove old sheaves and bushings by taking out the three bolts in the bushing and inserting them into the three threaded holes in the bushing. Tighten them sequentially to remove tapered bushing from the sheave. Remove old sheaves and bushings from the shaft.

Mount the new sheave onto shaft checking for nicks and burrs. Slide the bushing onto shaft. Avoid using force. If resistance occurs, lightly polish the shaft with crocus cloth until it slides freely. Place the three bolts through the unthreaded holes in the bushing and line them up with the threaded holes in the sheave. Locate sheave/bushing at the proper location on the shaft, insert keystocks, and tighten the three bushing bolts sequentially so that equal torque is applied to each.

Sheave alignment should be checked by placing a straightedge across the sheave faces so that it touches all four points of contact. Care must be taken to assure that sheaves have adequate clearances inside of belt guard.

D. Bearing Replacement (on V-Belt Drive models)

WARNING! *To ensure that the drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.*

Blower wheel and sheaves/bushings should be removed from the shaft before attempt-

ing to remove or replace bearings.

Clean shaft and bearing bore thoroughly. File flats on shaft at setscrew locations to permit easy removal of bearing.

Slip bearing into position. Be sure that bearing is not on a worn section of the shaft. For tighter fits tap inner ring face only with soft driver. DO NOT HAMMER ON HOUSING.

The bearing outer ring OD is spherical and swivels in the housing to accommodate misalignment. Snug hold-down bolts and use shaft to swivel each bearing until its final position is in the center of free movement top to bottom as well as side to side. Pass shaft through both bearings without forcing. This will prevent preloading of the bearings.

Shim mounting surfaces for full housing contact and vertical shaft adjustment — tighten hold-down bolts to proper torque (see table below). Turn shaft by hand. Resistance to turning should be the same as before full tightening of hold-down bolts.

The setscrews should be tightened alternately and in small increments to the torque specified in the table below. After 24 hours operation, the setscrews should be retightened to the torque in the table to assure full locking of the inner race to the shaft. Care should be taken that the socket key or driver is in good condition with no rounded corners and the key is fully engaged in the setscrew and held square with the setscrew to prevent rounding out of the setscrew socket when applying maximum torque. If a torque wrench is not available, the proper torque can be approximated by using a socket key with sufficient force to “spring” the key without permanently deforming it.

Recommended Torque for Setscrews and Bolts

Setscrews				**Hold Down Bolts**	
Size	Key Hex Across Flats	Recommended Torque (in-lbs)		Size	Wrench Torque (in-lbs)
		Min.	Max.		
No. 10	3/32	28	33	3/8-16	240
1/4	1/8	66	80	1/2-13	600
5/16	5/32	126	156	5/8-11	1200
3/8	3/16	228	275	3/4-10	2100

4.3 Troubleshooting

A. Introduction

This section can be used as a guide to troubleshoot possible malfunctions of mechanical and/or electrical components of this equipment.

B. Safety

Safety precautions should at all times be the highest priority when working on this

equipment. No troubleshooting work should be done until all power has been turned off and disconnected from electrical power supply.

Troubleshooting Table:

Problem	Possible Cause
Blower Inefficiency	1. Blower wheel rotating in wrong direction 2. Blower wheel installed backwards on shaft 3. Incorrect blower sizing 4. Sharp elbows or obstacles near inlets and outlets 5. Material buildup in tubing line, creating blockage 6. Overfeeding of material into the blower
Excessive Noise	1. Loose V-Drive belts 2. Loose components or guards on equipment 3. Worn bearings 4. System resonance or pulsation 5. Blower operating near “stall” due to incorrect system design 6. Type of material being conveyed
Excessive Vibration	1. Buildup of material on blower wheel 2. Bent wheel shaft damaged from improper handling or material impact. 3. Misaligned or unbalanced motor 4. Misaligned or worn bearings 5. Worn or damaged blower wheel 6. Loose mounting bolts, bearings, or guards
Premature Component Failure	1. Excessive blower speed 2. Negligence of maintenance 3. Abrasive or corrosive material in airstream 4. Bearing failure from incorrect or lack of lubrication 5. Prolonged vibration conditions 6. Extreme ambient or airstream temperatures 7. Motor overheating due to inadequate ventilation