

# Spencer® Single-Stage Scroll Blowers

Serial No:

Model No:

---

## Handling, Installing and Operating Instructions

---



---

## Important

Do not operate machine in unstable, low-flow range (surge).

Read and become familiar with this manual prior to uncrating and installing your Spencer Blower equipment. This precision equipment is capable of extended service and lifespan. Realization of this potential can best be achieved through proper handling and adherence to the instructions detailed here. Damage resulting from failure to follow correct procedures will void warranty.

# Contents

Page

I	General Instructions	2
II	Typical Scroll Blower	4
III	Lubrication Instructions	6
IV	Replacement Parts	6
V	Trouble Shooting Guide	7

Before proceeding with this set-up, refer to the machine nameplate and record the machine number and serial number in the boxes on the manual front cover.

## I. General Instructions

### Important

Read and become familiar with this manual prior to uncrating and installing or storing machinery – it is a precision piece of equipment capable of extended service and lifespan. Realization of this potential can best be achieved through proper handling and adherence to the following instructions. Damage resulting from failure to follow correct procedures will void warranty.

### Spencer Service

Spencer service begins upon receipt of your request for equipment purchase. Our engineers welcome the opportunity to discuss your problems and will assist in determining specification requirements if so desired. To serve you promptly, we maintain a large inventory of electric motors and machine parts. Also, by combining under one roof the constantly supervised manufacturing, assembly, and test procedures, Spencer can assure you of a unit capable of optimum performance under the most severe service conditions. All Spencer machines are factory tested for load capacities and vibrational characteristics. This assures long, trouble-free operations.

### Warranty

We warrant that this product will be free from defects in material and workmanship for a period of 18 months from date of shipment or 12 months from date of startup, whichever comes first. Within the warranty period, we shall repair or replace, F.O.B. our Factory or designated service center, such products that are determined by us to be defective.

**This warranty will not apply to any product which has been subjected to misuse, negligence, or accident or, misapplied or improperly installed. This warranty will not apply to any product which has been disassembled, repaired or otherwise altered by any persons not authorized by our Service Department.**

The guarantee of the motor, control, and component manufacturers govern the extent of our guarantee on such equipment. Warranty work on motors, controls, and components must be authorized by Spencer and must be performed in an authorized shop as designated by the motor, control, and component manufacturers. The Spencer Turbine Company reserves the right to invoice all expenses incurred when repairs are made in the field at the specific request of the customer.

### Handling

This machine has been carefully balanced and tested at our factory. It is essential that it be handled with care during installation in order that you may be assured satisfactory performance.

**2 Note: For complete warranty information, including our limitation of liability, consult Spencer's Terms and Conditions of Sale - Form 706.**

### Storage

**Caution: If machine is to be stored for an extended period of time, it must be carefully protected from dampness, dirt and vibration. The inlet and discharge should be covered to keep foreign matter out; the motor shaft should be periodically rotated a few times by hand. Failure to comply with any of the preceding will void warranty.**

### Location

**Caution: Do not locate unit in excessively hot area (> 104°F) unless equipment is designed for this condition.**

Before placing the machine in its operating position, be sure that the blower and motor are readily accessible for servicing by allowing several feet of clear space around the machine. Inaccessibility can prove costly in both time and labor.

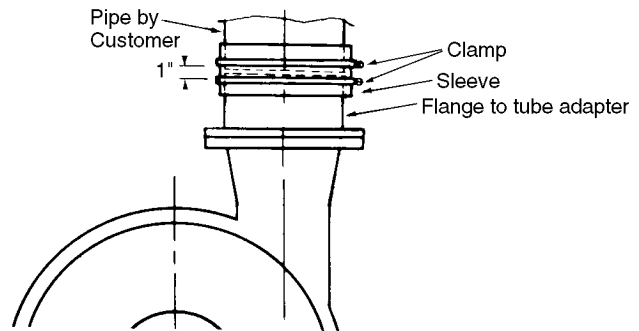
### Foundation

No special foundation is necessary for the Scroll Blower. A level concrete floor or block is recommended, although any other substantial floor will prove satisfactory. The blower should be placed on cork isolating pads furnished. The blower should not be vertically, or "wall" mounted.

### Tubing

All tubing should be of ample size to minimize frictional loss. It is absolutely essential that all joints be airtight and that there be no leaks in the system. Leaky air pipes consume a surprising amount of power and impair the operating efficiency of the machine. **Piping should be properly supported without producing any stress or strain on the machine casing. It is further recommended that the rubber or isolation sleeve supplied with the machine be used to connect it to the tubing system.**

### Rubber Inlet and Outlet Sleeve



The rubber connecting sleeve supplied with the scroll should be installed so that it covers a gap of approximately one inch as illustrated. The mounting clamps supplied with the sleeve should be adequately tightened to effect an air-tight connection.

### Electrical

**Caution: Be sure motor, starter, controls and other electrical equipment is the proper type suitable for the application and environment and complies with all applicable codes.**

Be sure that the motor furnished with this machine is wound for the same type of voltage available at the installation site. In making the electrical connections, follow the wiring instructions furnished. Wire and fuses should be of ample capacity to insure

that proper voltage is maintained at the motor terminals while starting and running. It is important that proper starting equipment be used. All AC machines should be equipped with a magnetic contactor or a manual or automatic compensator depending on the machine size and the installation regulations of the local power company. The starters should have thermal overload protection as well as true low-voltage protection.

#### D.C. Operation

D.C. motors should be equipped with manually operated or automatic resistance starters having several steps of resistance, and should be so timed that from 15 to 30 seconds are required to attain maximum speed. Commutator type motors must be kept clean and free from dirt, and worn brushes should be replaced to insure perfect contact with the commutator at all times. These brushes are carried in stock by Spencer for your convenience. **Important:** All replacement brushes must be of the same type as the original brushes.

#### Air Filters

**The Spencer Turbine Company recommends the use of inlet air filters on all Scroll Blowers for pressure applications.**

The use of any type of filter requires that it **be kept clean** to prevent excessive pressure drop in the lines. The dry element of the Spencer filter may be cleaned with soap & water and reused.

#### Silencers and Combination Filter-Silencers

Spencer offers silencers and combination filter-silencers for intake discharge, and bleed applications. The silencers should be properly supported at both ends. Rigid connection to the machine is not recommended. The tubing mount is recommended and connects to the machine with a rubber sleeve and a flange to tubing adapter.

#### Vacuum Applications

When the machine is used for vacuum, the outlet should discharge outdoors (preferred) or into a room having ample volume and proper ventilation in order to permit the air to escape and at the same time keep the unit at a reasonable temperature. Intake air must be kept clean through proper filtration methods.

#### Start Up

**Caution: It is very important that the blower be installed with regard to the correct direction of rotation. A direction-of-rotation arrow is affixed to the scroll casing.**

**Under no circumstances should the Scroll Blower be operated without being connected to the pipe system with which it is to be used.**

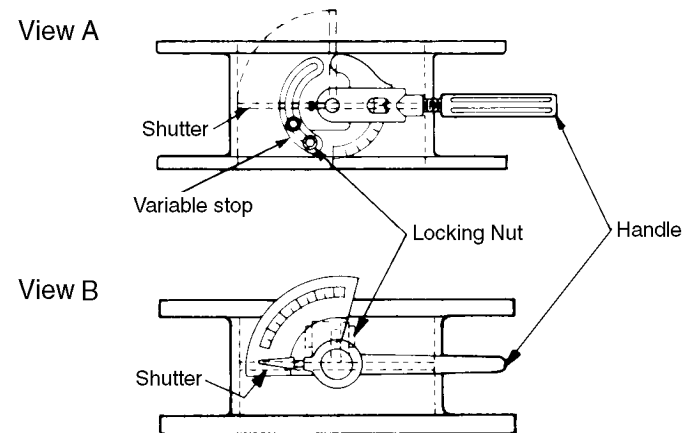
**When starting up a Scroll Blower it is recommended that the blast gate or other control device be closed.** When first starting the installation, an ammeter should be connected to the motor circuit and the control device opened until full load current is reached. At this point, the unit is delivering the full rated volume of air for which it was designed and the control device should be adjusted to prevent opening beyond this point. (See following paragraphs.)

#### Multiple Machine Operation

**Caution: All Scroll Blowers in a multiple machine operation should be operated periodically. This can be accomplished through bi-weekly, alternate operation of the machines.**

Check valves must be installed in the discharge of each Scroll Blower to prevent blow-back through the unit not in operation. These are available as optional equipment.

When operating two or more Scroll Blowers in parallel it is necessary to be sure that each machine carries its respective share of the load. This is accomplished by setting each blast gate so that the Scroll Blower operates within the full load amp rating of its motor. Once the proper setting is established, tighten bolts securing the variable stop (View A) or the locking nut (View B). This prevents the blast gate from being opened beyond the full load rating of the motor.



#### Instructions for Disassembly and Reassembly

**Caution: Parts must be reassembled in exactly the same relative positions. Therefore, it is recommended that each part be tagged as it is removed from the machine to facilitate later reassembly. It is especially important that the impeller location and its position on the shaft be marked.**

#### Balancing

Each machine is fully tested before leaving the Spencer factory to be sure vibrations, if any, are well within specifications for that particular machine. However, rough handling during shipment or improper disassembly/reassembly of a machine can upset its balance and result in excess vibration.

When a machine is being disassembled for repairs, mark the parts as they are removed. If this is done, no trouble should be expected from vibration when they are reassembled in the same order.

However, if the impeller is being replaced or there is any vibration due to an unbalanced condition after assembly, use the following procedure.

Run the unit at maximum speed. Mark the position of the impeller hub on the shaft. Loosen the bolts or screws holding the impeller on the shaft. Rotate the impeller 90° on the shaft. Run the machine again at the maximum speed, and check the vibration. Repeat this process until the best position is located for the impeller on the shaft so that there is no vibration or unbalance in the machine.

#### Disassembly

Scroll blowers are now being supplied with casing, motor base and casing/base support welded into a integral unit. This innovation provides a stable and maintenance free platform. As a result, maintenance is confined to removal of the motor on one

end and removal of the end head on the other. Removal of the end head provides immediate access to the impeller.

To disassemble the scroll blower, proceed as follows: Remove the bolts (8) securing end head (4) to the casing assembly. Remove the end head.

Measure or mark position of impeller on the shaft, loosen the three (or six) Allen socket screws three full turns, tap the heads of the screws. This will loosen the impeller from the tapered bushing allowing removal.

Remove the bolts holding the motor in place. Remove motor leaving the block and shims in their original place. The motor can now be overhauled. It is good maintenance practice and Spencer recommends replacing the division head packing (11) when motor removal/reinstallation is accomplished.

### Reassembly

Replace motor in original position on blocking and shims, making sure that shaft is centered in hole in division head and taking care not to damage packing (11). Be sure motor is perpendicular to division head so that fan is properly aligned within the casing. Tighten motor hold-down bolts fingertight. Replace fan and tighten Allen socket screws. Determine (by hand) that fan turns freely without interference. Without causing the motor to move, tighten motor hold-down bolts securely.

Replace end head gasket and end head in proper position. Insert all bolts. Then tighten uniformly. Machine is ready to run.

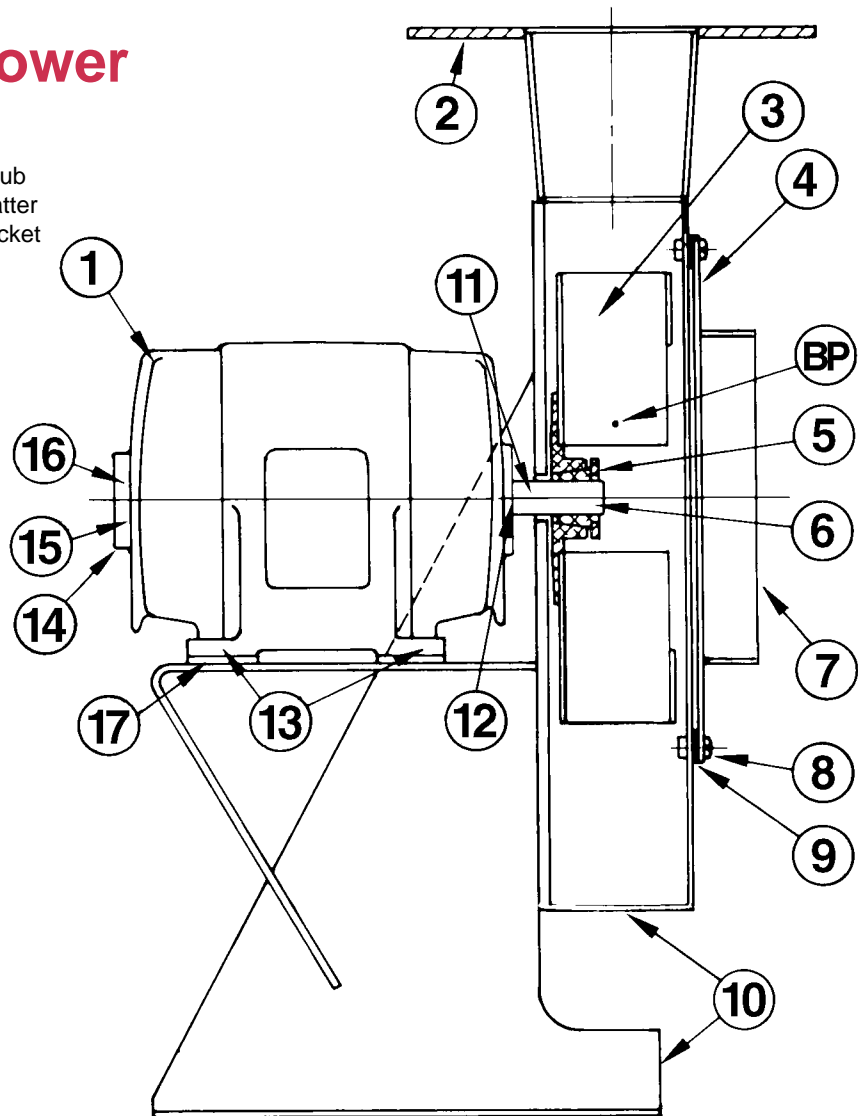
Check that motor leads are properly connected and motor is rotating in the right direction.

## II. Typical Scroll Blower

### Note:

1. The impeller is equipped with a split clamped hub or a tapered bushing clamp (as illustrated). The latter is tightened on the shaft with three or six Allen socket screws.

2. Contact Spencer for separate instructions for arrangement 9 (Belt Drive) single stage scrolls.

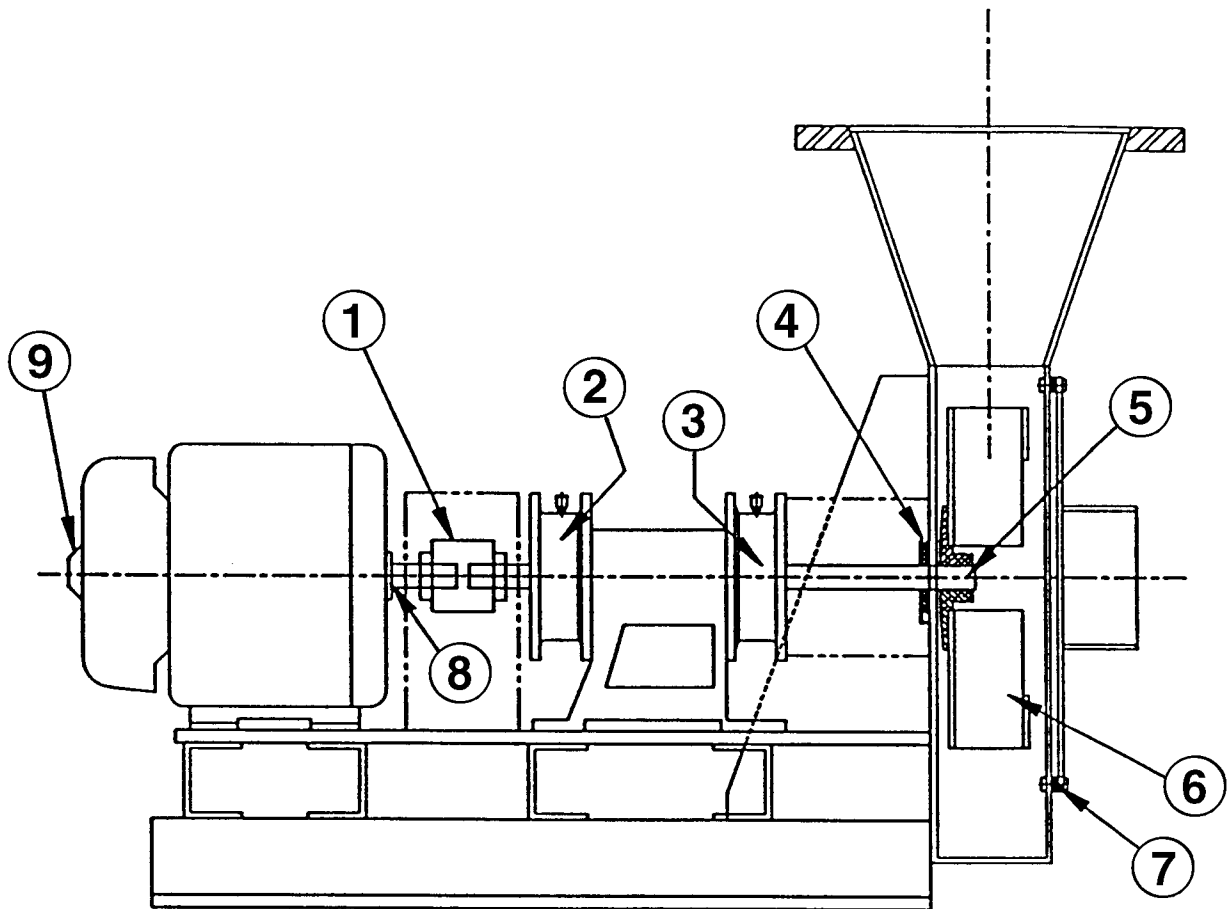


Screened items are recommended spare parts

- 1 - Front Motor End Bracket
- 2 - Discharge Flange
- 3 - Impeller
- 4 - End Head
- 5 - Impeller Allen Screws
- 6 - Motor Shaft
- 7 - Inlet
- 8 - End Head Bolts
- 9 - End Head Gasket

- 10 - Motor housing Assembly (Casing, Motor Base, Floor Support)
- 11 - Division Head Packing
- 12 - Rear Motor Bearing
- 13 - Motor Bolts
- 14 - Front Motor Bearing
- 15 - Thrust Bearing Nut
- 16 - Front Bearing End Cap
- 17 - Motor Shim
- BP- Balancing Point
- LP- Lifting Point (Half-moon cutouts in Scroll floor support)

# Arrangement 8: Four-Bearing Overhung Design



- Recommended spare parts
- 1 - Flexible Coupling
  - 2 - Inboard Bearing
  - 3 - Outboard Bearing
  - 4 - Division Head Packing
  - 5 - Shaft
  - 6 - Impeller
  - 7 - End Head Gasket
  - 8 - Rear Motor Bearing
  - 9 - Front Motor Bearing

# III. Lubrication Instructions

## General

The Scroll Blower requires no lubrication. It is necessary however, to check motor manufacturer's recommendations for motor bearings.

## Motor Bearings

Follow motor manufacturer's recommendations.

## Note:

Some motors equipped with sealed bearings are not intended to be re-lubricated. There are, therefore, no grease or drain plugs on motors of this type.

# IV. Replacement Parts

## How to order replacement parts

When ordering replacement parts, it is important that the information you furnish to Spencer is correct. Be sure when reading nameplates that you obtain the correct information. Remember, the more complete the information, the quicker the order will be processed; incomplete information will result in unnecessary delays and expense through callbacks. When in doubt, consult the factory for further information.

## To order replacement parts, furnish the following:

1. Machine model and serial number from machine nameplate.
2. Motor horsepower from motor nameplate.
3. Measure and record the casing diameter.
4. Refer to applicable illustration in the instruction manual and locate needed item by its circled call-out number. Refer to callout list for nomenclature and record.

# V. Trouble Shooting Guide

Trouble	Probable Cause	Corrective Action
<b>Insufficient air through system</b>	<p><b>Low pressure or vacuum as determined by measurement with a manometer:</b></p> <ul style="list-style-type: none"> <li>– Incorrect rotation.</li> <li>– Machine sized for requirements given, but air lines too small causing excessive frictional loss.</li> <li>– Valves in line, causing excessive losses.</li> <li>– Inlet or outlet partially blocked, i.e., clogged inlet filter, blast gate shaft slipped in handle and shutter does not open fully.</li> <li>– High inlet temperature, i.e., higher than designed inlet temperature.</li> <li>– Lower inlet pressure, i.e., lower than designed inlet pressure.</li> <li>– Machine not running at designed speed.</li> <li>– Lower than design gas density or specific gravity.</li> <li>– Machine air passages clogged with material.</li> <li>– Fans worn out due to explosion, abrasion, or vibration.</li> <li>– Pressure or vacuum gauge inaccurate – would not apply to performance of machine, but to gauge reading only.</li> </ul> <p><b>Machine design capacity too small for the system:</b></p> <ul style="list-style-type: none"> <li>– System requirements incorrectly calculated by customer.</li> </ul> <p>– Too many leaks and/or openings.</p> <p><b>Measuring gas or air flow incorrectly:</b></p> <ul style="list-style-type: none"> <li>– Flowmeters incorrectly calibrated.</li> </ul> <p>– No means of measurement available so customer is guessing at airflow.</p>	<p>Change motor leads to correct rotation. Increase line sizes or install machine providing higher output pressure. Install larger valves or install machine providing higher output pressure. Check blast gate; remove and repair if necessary.</p> <p>Direct inlet line to cooler area; replace machine with one designed for correct temperature. Remove inlet restrictions or install machine providing higher output pressure. Refer to motor manufacturer's instructions; check motor speed; check voltage connections. Check gas analysis; increase density or install machine designed for correct requirements. Disassemble, clean and inspect all parts. Replace fan(s). Calibrate gauge; always use a "U" tube manometer for checking pressure and/or vacuum.</p> <p>Install larger volume or lower vacuum machine to handle correct system requirements. Locate and repair all leaks.</p> <p>Calibrate flowmeters; be certain proper orifice is used for meter (check with flowmeter manufacturer). Obtain and install flowmeter.</p>
<b>Machine noisy</b>	<p><b>Internal machine malfunction:</b></p> <ul style="list-style-type: none"> <li>– Fan hitting after customer reassembly and/or fan slipping on shaft due to heat or excessive inlet pressure.</li> <li>– Fan coming apart due to age or wear from dirty air or gas.</li> <li>– Machine out of balance running rough.</li> <li>– Foreign material in machine.</li> </ul> <p><b>Motor malfunctions:</b></p> <ul style="list-style-type: none"> <li>– Excessive electrical hum or whine.</li> <li>– Wrong voltage – low voltage motor not up to speed. High voltage will burn out motor and also cause noticeably more noise.</li> <li>– Bearing failure.</li> <li>– Motor rebuilt improperly – thrust taken on wrong end in standard overhung machine.</li> <li>– Worn bearings or loose part.</li> <li>– Low frequency.</li> </ul>	<p>Reassemble according to instructions, tighten fan. Bleed air at low flow to reduce heat. Change inlet conditions if necessary. Replace fan. Rebalance and/or clean machine (refer to "<b>Machine Vibrating</b>"). Disassemble machine, inspect and clean. Reassemble and, if necessary, install filter to prevent further clogging.</p> <p>Check motor manufacturer's instructions. Check voltage supply and connections. Check for proper voltage at motor and correct.</p> <p>Check manufacturer's instructions and replace if necessary. Rebuild motor properly and correct end play.</p> <p>Tighten, repair or replace (check with motor manufacturer). Separate power supply; correct frequency.</p>
<b>Machine vibrating</b>	<p><b>Imbalance:</b></p> <ul style="list-style-type: none"> <li>– Material build-up on Impeller.</li> <li>– Shaft bent.</li> <li>– Faulty replacement motor installed and /or machine reassembled incorrectly.</li> <li>– Motor bearings worn.</li> </ul> <p><b>Mechanical:</b></p> <ul style="list-style-type: none"> <li>– Inlet and/or outlet piping connected to machine without flexible connector causing torque or strain on casing.</li> <li>– Machine bolted down causing change in alignment.</li> <li>– Piping not properly supported.</li> <li>– Improper voltage on motor causing assembly to operate at different speed.</li> <li>– Solids or liquids in, or passing through machine.</li> <li>– Machine not mounted on solid foundation, i.e., on unstable catwalk, etc.</li> </ul>	<p>Clean Impeller; install or improve filter to prevent further build up. Replace shaft. Disassemble machine, balance motor, reassemble according to instruction in this book and assembly print. Replace worn bearings.</p> <p>Install flexible connection at inlet and outlet.</p> <p>Remove bolts; use dowel pins or set in guide channels. Properly anchor piping beyond flexible connector. Check voltage and wiring connections; correct voltage.</p> <p>Disassemble, inspect and clean machine, install or improve filter to prevent further contamination. Re-inforce foundation.</p>
<b>Motor Hot (Can be checked with surface thermometer. Refer to factory for decision as to whether or not it is too hot.)</b>	<p><b>Incorrect motor selection:</b></p> <ul style="list-style-type: none"> <li>– Ambient temperature too high for insulation class.</li> <li>– Incorrect voltage.</li> <li>– Incorrect cycle.</li> <li>– Electrical short-circuit insulation failure.</li> <li>– Motor overloaded – blower too small for system.</li> </ul> <p><b>Unbalanced voltage supply:</b></p>	<p>Cool motor or replace with motor having proper insulation. Change to correct voltage. Change to correct cycle. Repair or replace motor. Install larger motor and/or blower. Check with power company for correction.</p>



## Products & Services

### Industrially rated products offering effective solutions for air and gas moving problems:

- Modular central vacuum systems
- Mobile or stationary integrated vacuum units
- Dust collectors and separators
- Multi-stage centrifugal blowers
- Single stage centrifugal blowers
- Regenerative blowers
- Positive displacement blowers
- Gas boosters
- Custom-engineered products with special materials for extreme temperatures and pressure

### Complementary accessories with single source convenience and compatibility:

- Standard and custom electrical control panels - U.L. and C.U.L. Listed available
- Comprehensive selection of tubing, fittings, vacuum hoses, valves and tools
- Valves, gauges, couplings, shrink sleeves, vibration isolators and other system components

### Comprehensive engineering and other customer support services:

- The industry's largest complement of technical specialists in air and gas moving technology
- Worldwide parts and service organization
- Application research and testing facility

### Worldwide organization of sales representatives and distributors offering:

- Product selection, installation and operation assistance
- Comprehensive system design services
- Follow-up services and troubleshooting

***For the name and telephone number of your local  
Spencer Representative, call 1-800-232-4321.***