DIRECT DRIVE TURBO BLOWERS

WARNING

These instructions are intended for use only by experienced, qualified combustion start-up personnel. Adjustment of this equipment and its components by unqualified personnel can result in fire, explosion, severe personal injury, or even death.

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These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.

WARNING

This equipment is potentially dangerous with the possibility of serious personal injury and property damage. Hauck Manufacturing Company recommends the use of flame supervisory equipment and fuel safety shutoff valves. Furthermore, Hauck urges rigid adherence to National Fire Protection Association (NFPA) standards and insurance underwriter's requirements. Operation and regular preventative maintenance of this equipment should be performed only by properly trained and qualified personnel. Annual review and upgrading of safety equipment is recommended.

A. GENERAL INFORMATION

The Hauck Fiberglass direct drive Turbo Blower is designed for use on any application requiring low pressure air at constant pressure ranging from 12 to 36 osig (52 to 155 mbar). This blower employs a unique molded scroll design and a turbine impeller to produce increased operating efficiency. These blowers are thoroughly tested prior to shipment to assure satisfactory performance when installed.

B. RECEIVING AND INSPECTION

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. A careful examination of all parts should be made to ascertain if there has been any damage in shipment.

IMPORTANT

If the installation is delayed and the equipment is stored outside, provide adequate protection as dictated by climate and period of exposure. Special care should be given to all motors and bearings, if applicable, to protect them from rain or excessive moisture.

C. INSTALLATION

IMPORTANT
Always lift the blower by the lifting access holes in the blower base, never by the motor lifting eye casing outlet, or inlet flange connections since they are not designed to support the weight of the motor and base assembly.

1. Mount the blower on any level concrete floor or pad. The location chosen must provide an unobstructed flow of air to the blower inlet. If the blower is installed on a floor on which other machinery is mounted, install vibration isolation pads between the blower base and the floor. In addition, the mounting bolts must be isolated from the blower base. This configuration is shown in Figure 1. Cork isolation pads are available from Hauck.

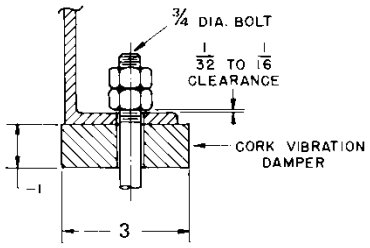

Figure 1. Illustration Depicting the Proper Placement of the Vibration Isolation Pad

If the blower is installed on a structure above the floor, the mass rigidity of the structure must be such that its natural frequency is well above the motor or impeller operating frequency to prevent resonance.

2. Ensure that the piping between the blower and the load has been selected to minimize pressure losses. The pressure drop for the control valve should be selected for the designed control quality, ranging from 5-30% of the system drop. It is suggested that, where practical, the piping, valves, fittings, etc. be sized for a total pressure drop of no more than 3.4"wc (86 mm wc) or 2 osi.

3. Rotate the blower air outlet, as required, to align it with the air piping. Each blower is constructed to allow the impeller to rotate in only one direction. Two types of blowers are manufactured; one provides for clockwise rotation, the other counterclockwise rotation. The discharge outlet on each of these types can be rotated to any one of the seven positions shown in Figure 2.

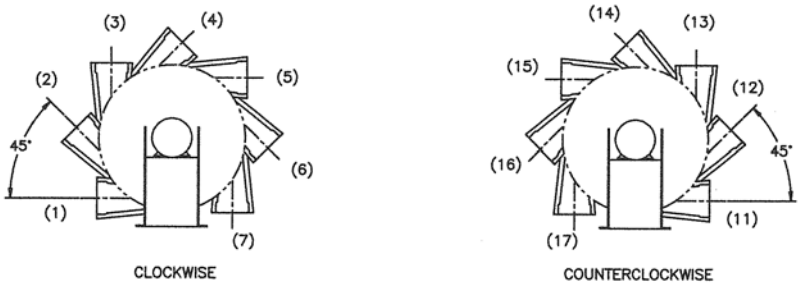

Figure 2. Standard Discharge Positions Viewed from Motor Drive End

To rotate the casing, accomplish the following. **Do not disassemble the two casing halves.**

A. Loosen and remove the eight bolts holding the casing to the base assembly
B. Rotate the casing as required and reseat the casing against the base assembly.
C. Ensure that all bolt holes are aligned.
D. Reinsert and securely tighten all eight bolts.

4. Connect the air piping to the blower outlet using the rubber sleeve and clamps supplied with each blower. **Ensure that the air piping is completely supported by external hangers to prevent unnecessary strain on the blower casing.** In addition to preventing vibration transfer to the blower, the rubber sleeve prevents the induction of loads in the casing due to misalignments between the piping system and the blower discharge connection.

5. Seal all joints in the air piping. The piping must be airtight to prevent leaks which would cause the motor to run overloaded.

6. Ensure that the supply voltage and frequency are correct for the motor. The supply voltage at the motor terminals must be within 10% of the nameplate value, and the frequency within 5%, for satisfactory performance of the equipment. **Low voltage or frequency will impair blower performance and can cause motor damage.**

7. Connect the line leads to the motor. Follow the wiring diagram on the motor. **The use of a VFD or soft start is recommended in any application and is required where the blower is not being used to supply combustion air. Frequent starting and stopping of the blower without a VFD or soft start can lead to premature fatigue failure in the impeller.** Supply the power through a properly sized contactor or magnetic starter with thermal overload protection. Pre-sized motor starters are available from Hauck.

8. Rotate the impeller by hand to ensure that there are no restrictions.

9. Ensure that the three set screws on the impeller hub are tight. (Refer to Maintenance Section).

10. Install the filter, silencer, or combination filter-silencer if used. Blowers are normally purchased with these accessories. However, any of these accessories may be purchased separately. To properly install the unit, accomplish the following:

    A. Dip the new filter in oil and allow it to drain thoroughly. Use SAE 10-30 oil when ambient temperatures are below 70°F (21°C) and SAE 30-50 oil when temperatures are above 70°F (21°C).
    B. Bolt the accessory to the inlet flange of the blower. These accessories are designed to be attached by an eight-stud flange (ten-stud flange for the 18" model). In some cases, four additional holes must be drilled in the inlet flange to accommodate these studs. **When drilling, ensure that the blower casing is not damaged.**
    C. Properly position the accessory's supporting leg (Hauck supplied if required). **Do not allow the entire weight of these accessories to be supported by the flange of the blower casing.**

NOTE

All rotating components were balanced from factory at a level meeting ISO 1940-2. A variety of external causes such as handling, installation, or misalignment may cause imbalance prior to use. To ensure the intended long life of the equipment and components, and to meet warranty requirements, equipment and vibration levels should be checked by experienced personnel and trim balanced if no longer meeting ISO 1940-2 requirements. Under no circumstances should equipment with excessive vibration be operated at the risk of damaging that equipment or the personnel operating it.

D. OPERATION

Never run the blower without either a discharge or an inlet restriction. If run wide open at both inlet and outlet, the motor will be severely overloaded and probably damaged.

Always check the direction of impeller rotation at first start-up and after all wiring changes.

Before starting the blower for the first time, the impeller should be rotated to be sure there are no restrictions to its free turning. Ensure that the three setscrews on the impeller hub are tight. **Run the blower for 15 minutes, then recheck the setscrews. After one week of operation, recheck the setscrews and tighten if necessary.** Thereafter, periodically check the setscrews (Refer to Maintenance Section).

E. MAINTENANCE

Filters

Periodically clean all filters by accomplishing the following:

1. Remove the filter by releasing the restraining screw located on the end of the filter.
2. Clean the filter with a suitable solvent.
3. Allow the filter to dry thoroughly.
4. Dip the new filter in oil and allow it to drain thoroughly. Use SAE 10-30 oil when ambient temperatures are below 70°F (21°C) and SAE 30-50 oil when temperatures are above 70°F (21°C).

> **WARNING**
> If flammable solvents are used to clean a filter element for a blower supplying air for combustion, be sure the element is completely dry before oiling. Make sure all excess oil has drained from the element before reinstalling it on the blower. Combustible vapors drawn into this type of air system can cause serious explosions.

5. Reinsert the filter in the mounting collar. Securely fasten in place. Ensure that the supporting leg (if present) is properly positioned.

Impeller Removal/Replacement

> **IMPORTANT**
> Upon receipt, carefully check the replacement impeller to be sure no damage has occurred during shipment or handling. Any changes made to the turbo blower assembly could cause detectable differences in vibration levels. However, since each impeller is centrifugally balanced before shipment Quality Grade G6.3 of the ISO Standard 1940, impeller replacement in itself should not cause concern. If excessive vibration level is suspected before or after impeller replacement, obtain quantitative peak-to-peak displacement or velocity vibration readings at the motor bearings prior to consulting the factory.

If it should become necessary to inspect and/or replace the impeller, the following procedures should be followed. The numbers in parentheses refer to items in Figure 3.

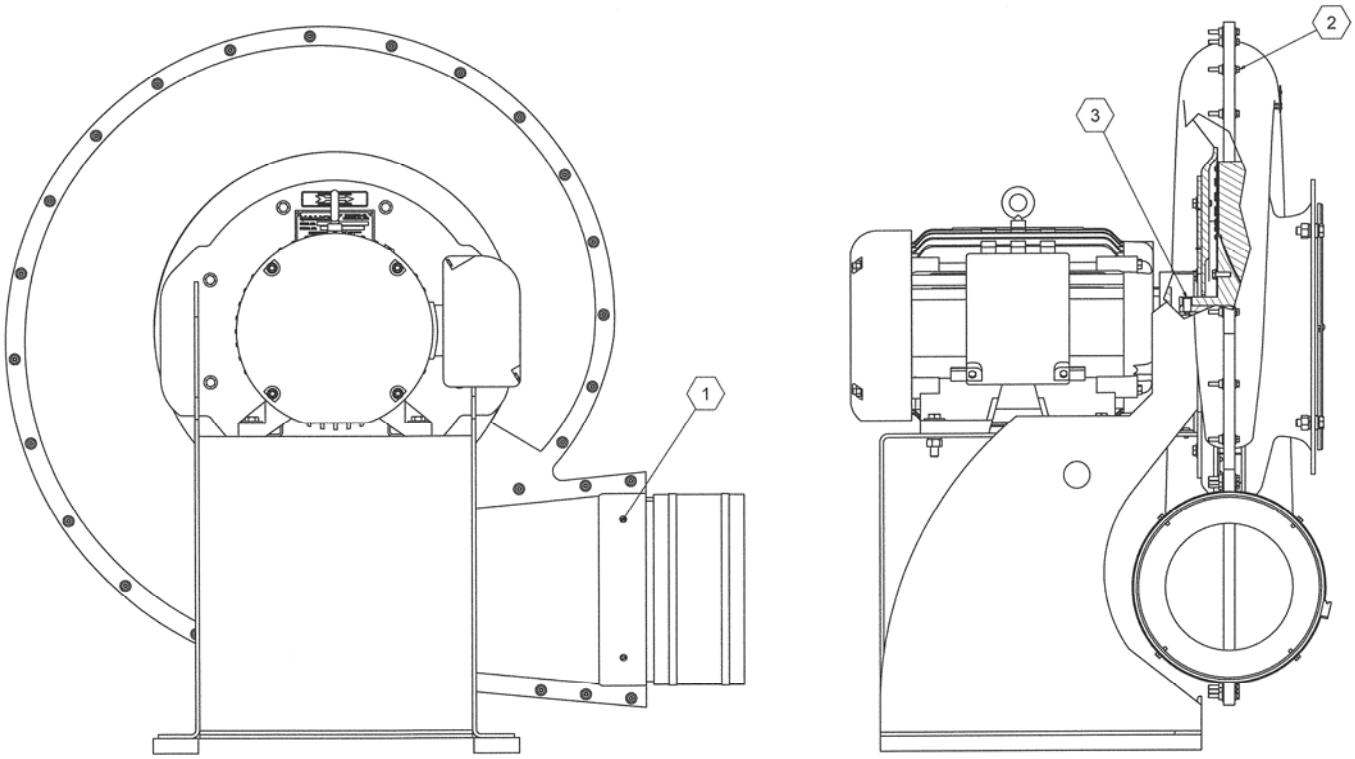

Figure 3. Typical Direct Drive Turbo Blower

1. Remove bolt self-tapping screws (1) holding the front half of the casing to the outlet adapter.
2. Remove all of the hex head bolts (2) located around the casing flange.
3. Separate the two halves. The two halves are factory sealed with a resin coating. To facilitate their separation, it is recommended that a knife be drawn along the joining edge of the halves. Moderate force may be required to overcome the seal between the casing halves.
4. Loosen the three setscrews (3) at the rear of the impeller hub. **Do not remove the stud or lock nut at the center of the impeller.**
5. Pull the impeller from the motor shaft. The key will separate from the motor shaft and impeller hub key way (Do not misplace the key as it will be reused).
6. Inspect the impeller and replace if necessary.
7. Clean any burrs from the shaft caused by the setscrews. If necessary, use an emery cloth to restore a smooth surface.
8. Apply an antiseize compound to the impeller hub bore and the shaft.
9. Place the motor shaft keyway at the 12 o'clock position and insert the key.
10. After ensuring that the impeller hub keyway is aligned with the key on the motor shaft, slide the impeller on the shaft.
11. Add a thin bead of latex caulk to help re-seal the casing halves, and replace the front half of the casing and tighten all casing hex head bolts (2). (Hauck recommends a quick-dry siliconized acrylic caulk).

NOTE

In order to ensure an effective air seal, it is important that a suitable acrylic latex caulking be placed between the outlet adapter and the casing halves for a short distance in each direction. Suggested approximate area of caulking is shown shaded in Figure 3.

12. Replace the self-tapping screws (1) which hold the front half of the casing to the outlet adapter.

IMPORTANT

It is important to reinsert the key before attempting to tighten the impeller setscrews. Failure to do so will prevent proper tightening of the key setscrew. It is also imperative that the sequence and torquing procedure outlined be followed exactly. Failure to sufficiently tighten the setscrews may allow the impeller to further loosen during operation of the blower, while excessive tightening may damage the setscrews as well as impair their effectiveness.

Blower Hub Locking Mechanism

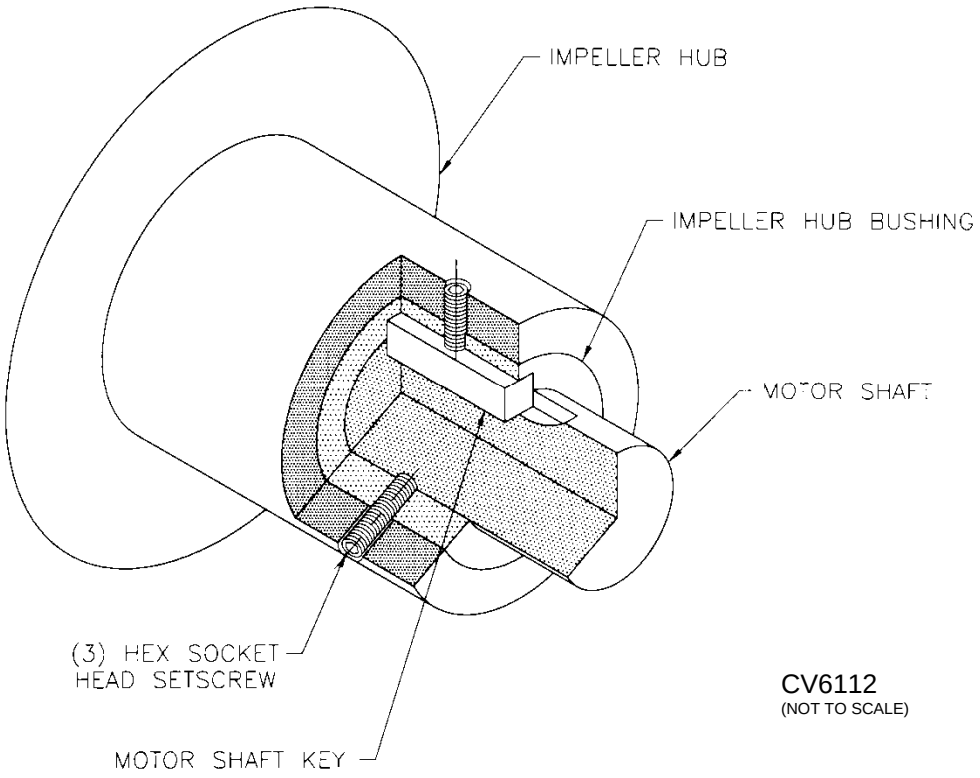

Figure 4. Blower Hub Locking Mechanism Cutaway

There are three setscrews, positioned 120° apart, that are used to secure the impeller to the shaft by means of the blower hub locking mechanism. One of the three setscrews is located over the key. The procedure below should be followed closely to properly secure the impeller.

1. Remove the three hex socket head setscrews and liberally apply Loctite 243.

2. Replace the setscrew loosely and slide the impeller back and forth on the shaft until the impeller is positioned at the midpoint of its travel range.

3. Snug **either** setscrew that is **not** over the key. Then snug the second setscrew that is **not** over the key.

4. Snug the setscrew that **is** over the key.

5. Torque the three setscrews to 400 in-lb (45 N-m).

IMPORTANT

Before starting the blower for the first time, the impeller should be rotated to be sure there are no restrictions to its free turning. **Operate the blower for 15 minutes,** then recheck the setscrews. **After one week of operation,** recheck the setscrews and retorque if necessary. Thereafter, periodically check the setscrews.

Motor Removal/Replacement

If it should become necessary to remove and replace the motor on a Hauck direct drive Turbo Blower, follow the procedure below.

CAUTION

Ensure that electrical power cannot be accidentally applied to the motor during disassembly.

1. Loosen the three setscrews at the rear of the impeller hub.
2. Remove the four nuts and bolts which fasten the motor to the blower base.
3. Pull the shaft from the impeller. **Do not remove the stud or lock nut at the center of the impeller.**
4. Inspect the impeller hub. Clean any dirt or burrs from inside of hub bushing.
5. Clean any burrs from shaft of the existing or new motor which may have been caused by setscrews. If necessary, use an emery cloth to restore a smooth surface.
6. Apply an antiseize compound to the impeller hub bore and shaft.
7. Place the new motor on the blower base and slide the impeller onto the shaft.
8. Replace and securely tighten the four nuts and bolts which fasten the motor to the blower base.
9. Slide the impeller back and forth on the shaft and position at the mid-point of its travel.
10. Tighten the three impeller setscrews. (Refer to Blower Hub Locking Mechanism under Maintenance Section).
11. Rotate the impeller by hand to ensure that there are no restrictions to its free turning.
12. After one week of operation, recheck the setscrews and tighten if necessary.

A Troubleshooting Checklist is provided in the appendix of these instructions.

APPENDIX:

TROUBLESHOOTING CHECKLIST

Symptom	Cause	Correction
1. Motor Will Not Start	A. Open Circuited	-Check Continuity Of Wiring
	B. One Phase Not Connected (Motor Hums but Doesn't Turn)	-Check Continuity Of Wiring -Check For Open Breakers or Blown Fuses -Check Proper Terminal Wiring
	C. Motors Burned Out	-Check Last Known Operating Load For Possible Overload Conditions -Check Ambient Operating Conditions
2. Motor Blows Fuses When Starting Is Attempted	A. Grounded Internal Winding	-Replace Motor
	B. Improper Terminal Wiring	-Rewire
3. Motor Operates Very Hot	A. High Ambient Temperature	-Class B Insulation Rated For Maximum Service At 104°F (40°C) Ambient
	B. Motor Running Overloaded	-Check For Excessive Leaks In The System or Blower -Check Design Capacity Against System Rating
	C. Improper Voltage Applied To Terminals or Improperly Wired	-Check Voltage Against Rating -Check Wiring Connections
	D. Interference Between the Rotor and Stator	-Replace motor
	E. Short Circuited Windings In Motor	-Replace Motor
4. Generated Pressure Lower Then Rated Value	A. Improperly Located Pressure Gauge	-Check For Improper Location Location Downstream Of Elbows, Butterfly Valves, etc.
	B. Blower Operating Above Design Capacity (Motor Overloaded)	-Check For Excessive Leaks In The System or Blower -Check Design Capacity Against System Rating -Check For Missing Orifice Plates -Check Burner Discharge For Areas Opened By Excessive Heat
	C. Impeller Running Backwards	-Rewire Motor to Reverse Rotation
	D. Impeller Running Correctly but Built For Wrong Direction Of Rotation	-Replace Impeller With One For Proper Direction of Rotation

APPENDIX:

TROUBLESHOOTING CHECKLIST

Symptom	Cause	Correction
	E. Motor Not Generating Nameplate Speed	-Check Motor Voltage and Frequency Against Nameplate Rating and Proper Wiring -Replace Motor
	F. High Ambient Temperature and/or High Altitude	-Check Inlet Conditions; consult Hauck.
	G. Inlet Obstructed	-Remove Obstruction or Move Blower To Provide Free Air Flow Into Inlet Opening
5. Blower Vibrates Excessively	A. Rotor Unbalanced	-Class For Material Buildup On Impeller -Check For Mechanical Damage To Impeller, Repair or Replace -Rebalance Impeller
	B. Loose Motor Mounts	-Tighten Bolts
6. Excessively Noisy Operation	A. Vibration Being Transmitted To Surrounding Structure	-See Vibration Corrections Above -Install Isolation Pads and Flexible Connections Between Blower and Surroundings
	B. Rotating Member Touching A Stationary Member	-Check Free Turning In Both the Impeller and Motor, Adjust as Necessary
	C. Motor Bearings Worn-out	-Replace Motor
	D. Air Leaking From System	-Tighten Joints, Flanges and Fittings. Look for Unplugged Holes In Piping