

**Series L: Models LB, LBP, LD, and LDP
Low Silhouette Centrifugal Roof Exhaust Fans**

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage!

Series L Exhaust Fans

Greenheck’s Series L, low silhouette, models LD, LB, LDP, and LBP centrifugal roof exhaust fans provide the industry’s best performance and durability for general clean air applications. Series L exhaust fans have the broadest performance in the industry, up to 1.25 in. wg (311 Pa) and 37,500 cfm (63,713 m³/hr).

The severe duty models LDP and LBP are far superior to any centrifugal roof exhaust fan currently in the market. Specifically designed for applications with extremely high structural design load requirements. Designed with structural steel supports and ESD-603D louver blades, the severe duty louver enclosure (SDLE) may be used in any application which requires a fan to endure high winds with the potential of wind blown debris. Miami-Dade notice of acceptance number 03-0422.05.



General Safety Information

Only qualified personnel should install this fan. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.
2. The rotation of the wheel is critical. It must be free to rotate without striking or rubbing any stationary objects.
3. Motor must be securely and adequately grounded.
4. Do not spin fan wheel faster than max cataloged fan RPM. Adjustments to fan speed significantly effects motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
5. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces, or chemicals. Replace cord immediately if damaged.
6. Verify that the power source is compatible with the equipment.
7. Never open access doors to a duct while the fan is running.

DANGER
Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.
CAUTION
When servicing the fan, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.
CAUTION
Precaution should be taken in explosive atmospheres.

Receiving

Upon receiving the product, check to make sure all items are accounted for by referencing the bill of lading to ensure all items were received. Inspect each crate for shipping damage before accepting delivery. Notify the carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all the copies of the bill of lading which is countersigned by the delivering carrier. A Carrier Inspection Report should be filled out by the carrier upon arrival and reported to the Traffic Department. If damaged upon arrival, file a claim with carrier. Any physical damage to the unit after acceptance is not the responsibility of Greenheck Fan Corporation.

Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Sometimes it is not possible that all items for the unit be shipped together due to availability of transportation and truck space. Confirmation of shipment(s) must be limited to only items on the bill of lading.

Handling

When lifting the unit to the roof, securely fasten straps to the drive frame located in the motor compartment. Access to the motor compartment is accomplished by removing bolts securing the hood to the base. The hood cover will need to be removed for access to the drive frame. The cover can then be removed and placed on a flat surface in an area protected from strong winds.

When unit is on the roof, move fan to desired location and fasten securely through mounting holes in base. Shims may be necessary depending upon roof material thickness.

The motor amperage and voltage ratings must be checked for compatibility to supply voltage prior to final electrical connection. Electrical lead-in wires should be run through the conduit provided between the curb and the bottom of the motor compartment. Wiring must conform to local and national codes.

CAUTION

Do not lift by the fan hood. Avoid lifting fans in a way that will bend or distort fan parts. Never pass slings or timbers through the venturi of fan. Fans with special coatings or paints must be protected in handling to prevent damage.

Storage

Fans are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the fan and accessories

while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

Indoor

The ideal environment for the storage of fans and accessories is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C), wide temperature swings may cause condensation and “sweating” of metal parts. All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice, or snow and wipe dry before moving to indoor storage. To avoid “sweating” of metal parts allow cold parts to reach room temperature. To dry parts and packages use a portable electric heater to remove any moisture build up. Leave coverings loose to permit air circulation and to allow for periodic inspection. The unit should be stored at least 3½ inches (89 mm) off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Aisles between parts and along all walls should be provided to permit air circulation and space for inspection.

Outdoor

Fans designed for outdoor applications may be stored outdoors, if absolutely necessary. Roads or aisles for portable cranes and hauling equipment are needed.

The fan should be placed on a level surface to prevent water from leaking into the fan. The fan should be elevated on an adequate number of wooden blocks so it is above water and snow levels and has enough blocking to prevent it from settling into soft ground. Locate parts far enough apart to permit air circulation, sunlight and space for periodic inspection. To minimize water accumulation, place all fan parts on blocking supports so rain water will run off.

Do not cover parts with plastic film or tarps as these cause condensation of moisture from the air passing through heating and cooling cycles. Fan wheels should be blocked to prevent spinning caused by strong winds.

Inspection and Maintenance During Storage

While in storage, inspect fans once per month. Keep a record of inspection and maintenance performed. If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection, rotate the wheel by hand ten to fifteen revolutions to distribute lubricant on motor. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with special coatings may require special techniques for touch-up or repair.

Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint-free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper and

oil. Do not destroy the continuity of the surfaces. Thoroughly wipe clean with Tectyl® 506 (Ashland Inc.) or the equivalent. For hard to reach internal surfaces or for occasional use, consider using Tectyl® 511M Rust Preventive, WD-40® or the equivalent.

Series L Dimensions

Model LB		Size	A	B	C	D	E	F	Damper Size	Roof Opening	Weight Galv.
	10	22 (559)	39 (991)	28 (711)	17¼ (438)	17 (432)	3¼ (85)	12 (305)	14½ (368)	56 (25)	
	14	26 (660)	39 (991)	35 (889)	17½ (445)	18 (457)	4 (102)	16 (406)	18½ (470)	81 (37)	
	18	30 (762)	39 (991)	40 (1016)	17½ (445)	21 (533)	4½ (114)	18 (457)	20½ (521)	135 (61)	
	21	30 (762)	51 (1295)	43 (1092)	23 (584)	23 (584)	6 (152)	18 (457)	20½ (521)	145 (66)	
	24	34 (864)	51 (1295)	45½ (1156)	20½ (521)	23½ (597)	6¾ (171)	24 (610)	26½ (673)	188 (85)	
	30	40 (1016)	63 (1600)	50 (1270)	29½ (749)	26¾ (676)	8½ (216)	30 (762)	32½ (826)	249 (113)	
	36	46 (1168)	63 (1600)	60 (1524)	27 (686)	32¾ (829)	9¾ (248)	36 (914)	38½ (978)	338 (153)	
	42	52 (1321)	75 (1905)	70¾ (1794)	33½ (851)	37¾ (949)	11½ (292)	42 (1067)	44½ (1130)	396 (180)	
	48	58 (1473)	87 (2210)	70¾ (1788)	41 (1041)	41½ (1054)	11¾ (295)	48 (1219)	50½ (1283)	430 (195)	
	54	64 (1626)	87 (2210)	79½ (2019)	38 (965)	45¾ (1153)	12½ (318)	54 (1372)	56½ (1435)	596 (270)	
Model LBP		Size	A	B	C	D	E	F	Damper Size	Roof Opening	Weight Alum.
	10	22 (559)	38½ (978)	28 (711)	14 (356)	17 (432)	32¾ (829)	12 (305)	14½ (368)	99 (45)	
	14	26 (660)	40 (1016)	32 (813)	16 (406)	17 (432)	26 (660)	16 (406)	18½ (470)	116 (53)	
	18	30 (762)	46 (1168)	36 (914)	19 (483)	24½ (622)	30 (762)	18 (457)	20½ (521)	179 (81)	
	21	30 (762)	46 (1168)	36 (914)	19 (483)	24½ (622)	30 (762)	18 (457)	20½ (521)	191 (86)	
	24	34 (864)	49½ (1257)	40 (1016)	20 (508)	23½ (597)	34 (864)	24 (610)	26½ (673)	239 (108)	
	30	40 (1016)	58 (1473)	46 (1168)	23 (584)	26½ (673)	40 (1016)	30 (762)	32½ (826)	318 (144)	
	36	46 (1168)	63 (1600)	51¾ (1314)	26 (660)	34¾ (873)	46 (1168)	36 (914)	38½ (978)	444 (201)	
	42	52 (1321)	70½ (1791)	58 (1473)	29 (737)	38¼ (972)	52 (1321)	42 (1067)	44½ (1130)	530 (240)	
	48	58 (1473)	76½ (1943)	64 (1626)	32 (813)	40¾ (1026)	58 (1473)	48 (1219)	50½ (1283)	579 (263)	
	54	64 (1626)	83½ (2121)	70 (1778)	35 (889)	43¾ (1108)	64 (1626)	54 (1372)	56½ (1435)	780 (354)	
Model LD		Size	A	B	C	D	E	F	Damper Size	Roof Opening	Weight Galv.
	60-75	17 (432)	22 (559)	27 (686)	13½ (343)	13 (330)	2 (51)	8 (203)	10½ (267)	37 (17)	
	80-95	19 (483)	28 (711)	27 (686)	13½ (343)	16 (406)	4 (102)	10 (254)	12½ (318)	45 (20)	
	100-120	22 (559)	30 (762)	27 (686)	13½ (343)	18 (457)	4 (102)	12 (305)	14½ (368)	57 (26)	
Model LDP		Size	A	B	C	D	E	F	Damper Size	Roof Opening	Weight Alum.
	60-75	17 (432)	23 (584)	11½ (292)	13½ (343)	—	8 (203)	10½ (267)	49 (22)		
	80-95	19 (483)	25 (635)	12½ (318)	16½ (419)	—	10 (254)	12½ (318)	63 (29)		
	100-120	22 (559)	28 (711)	14 (356)	18½ (470)	—	12 (305)	14½ (368)	82 (37)		

All dimensions given in inches (millimeters). Weights given in pounds (kilograms).



Removing From Storage

As fans are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the fan equipment goes into operation.

Pre-Startup Checks

1. Check all fasteners for tightness. The wheel should rotate freely and be aligned as shown in Figure 1.

WHEEL OVERLAP AND GAP DIMENSIONS		
Model	G - Overlap in. (mm)	H - Gap in. (mm)
LD/LDP 60-095	-	$\frac{3}{32}$ (2)
LD/LDP 100-120	-	$\frac{1}{4}$ (6)
LB/LBP 10-14	$\frac{1}{4}$ (6)	-
LB/LBP 18-24	$\frac{3}{8}$ (10)	-
LB/LBP 30-54	$\frac{1}{2}$ (13)	-

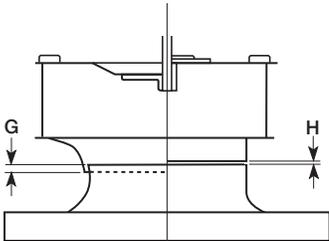


Figure 1

2. Wheel position is preset and the unit is test run at the factory. Movement may occur during shipment, and realignment may be necessary.
3. Centering can be accomplished by loosening the bolts holding the drive frame to the shock mounts and repositioning the drive frame.
4. Wheel and inlet cone overlap can be adjusted by loosening the setscrews in the wheel and moving the wheel to the desired position.
5. Check wheel rotation by momentarily energizing the unit. Rotation should be clockwise as shown in Figure 2 and correspond to the rotation decal on the unit. Rotation is determined when the unit is viewed from the motor or shaft pulley side.

WHEEL ROTATION

All Series L fans have clockwise (CW) wheel rotation when viewed from top of fan.

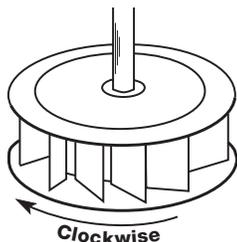


Figure 2

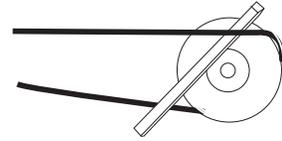
WARNING

Correct direction of wheel rotation is critical. Reversed rotation will result in poor air performance, motor overloading and possible motor burnout.

Pre-Starting Belt Tension Checks

6. Always loosen tension enough to install belt without stretching, see Figure 3.

BELTS



Do not force belt(s). Forcing the belt(s) will break the cords and cause belt failure

Figure 3

7. If adjustments are made, it is very important to check the pulleys for proper alignment. Misaligned pulleys lead to excessive belt wear vibration, noise and power loss, see Figure 4.

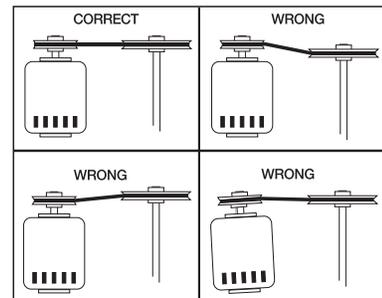


Figure 4

8. Belt tension can be adjusted by loosening four fasteners (marked "R" in Figure 5) on the drive frame. This allows the motor plate to slide on the drive frame angles for proper positioning.

FASTENERS

*Identical fasteners on opposing side must also be loosened.

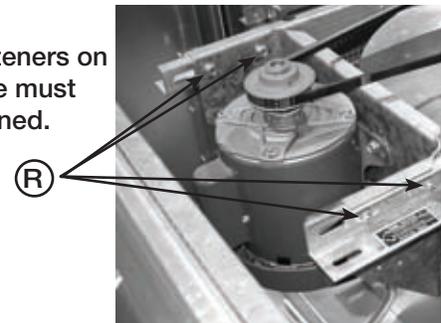


Figure 5

9. Belt tension should be adjusted to allow $\frac{1}{64}$ in. (0.397 mm) of deflection per inch of belt span. For example, a 15 in. (381 mm) belt span should have $\frac{15}{64}$ in. (0.234 mm) (or about $\frac{1}{4}$ in. (6 mm)) of deflection with moderate thumb pressure at mid-point between pulleys, see Figure 6.

WARNING

The fan has been checked for mechanical noises at the factory prior to shipment. If mechanical noise should develop, suggested corrective actions are offered in the Troubleshooting section.

WARNING

Over tightening will cause excessive bearing wear and noise. Too little tension will cause slippage at startup and uneven wear.

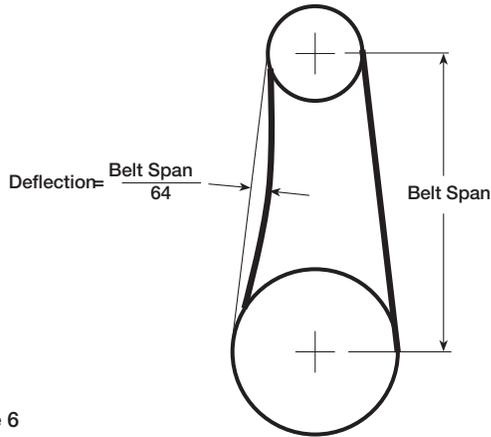


Figure 6

10. The adjustable motor pulley is factory set for the RPM specified. Speed can be increased by closing or decreased by opening the adjustable motor sheave.
11. Two groove variable pitch pulleys must be adjusted an equal number of turns open or closed.
12. Any increase in speed represents a substantial increase in the horsepower required by a unit.
13. Motor amperage should always be checked to avoid serious damage to the motor when speed is varied.

IMPORTANT

Adjust (tighten) belt tension after the first 24-48 hours of operation.

Maintenance

Motor maintenance is generally limited to cleaning and lubrication (where applicable). Cleaning should be limited to exterior surfaces only. Removing dust buildup on motor housing ensures proper motor cooling.

Greasing of motors is only intended when fittings are provided. Many fractional hp motors are permanently lubricated and should not be lubricated further. Motors supplied with grease fittings should be greased in accordance with manufacturers' recommendations. Where motor temperatures do not exceed 104°F (40°C), the grease should be replaced after 2000 hours of running time as a general rule. Wheels require very little attention when moving clean air. Occasionally, oil and dust may accumulate causing imbalance. When this occurs, the wheel and housing should be cleaned to ensure smooth and safe operation.

All fasteners should be checked for tightness each time maintenance checks are performed prior to restarting unit.

A proper maintenance program will help these units deliver years of dependable service.

WARNING

Always disconnect, lock and tag power source before servicing. Failure to disconnect power source can result in fire, shock or serious injury.

WARNING

Uneven cleaning of the wheel will produce an out of balance condition that will cause vibration in the fan.

WARNING

This unit should be made non-functional when cleaning the wheel or housing (fuses removed, disconnect locked off).

Belt/Bearing Maintenance

1. Belts tend to stretch after a period of time. They should be checked periodically for wear and tightness. When replacing belts, use the same type as supplied with the unit.
2. Matched belts should always be used on units with multi-groove pulleys.
3. For belt replacement, loosen the tensioning device far enough to allow removal of the belt by hand. Do not force belts on or off. This may cause cords to break, leading to premature belt failure.
4. Once installed, adjust belts as shown in "Pre-Starting Checks."
5. Shaft bearings can be classified in two groups: relubricating and non-relubricating. All bearings are factory lubricated and require no further lubrication under normal use (between -20°F and 180°F (-29° to 82°C) in a relatively clean environment).
6. Units installed in hot, humid or dirty locations should be equipped with special bearings. These bearings will require frequent lubrication. Caution should be employed to prevent overpacking or contamination.
7. Grease fittings should be wiped clean. The unit should be in operation while lubricating. Extreme care should be used around moving parts.
8. Grease should be pumped in very slowly until a slight bead forms around the seal. A high-grade lithium base grease is recommended.
9. Direct drive units require little maintenance except for cleaning, wheel alignment, and oiling according to motor label instructions.

Parts List

NOTE: Each fan bears a manufacturer's nameplate with model number and serial number embossed. This information will assist the local Greenheck representative and the factory in providing service and replacement parts. Before taking any corrective action, make certain unit is not capable of operation during repairs.

CAUTION: A fan manufactured with an explosion-resistant motor does not certify the entire unit to be explosion proof. Refer to UL Listing Mark for the fans approved usage.

