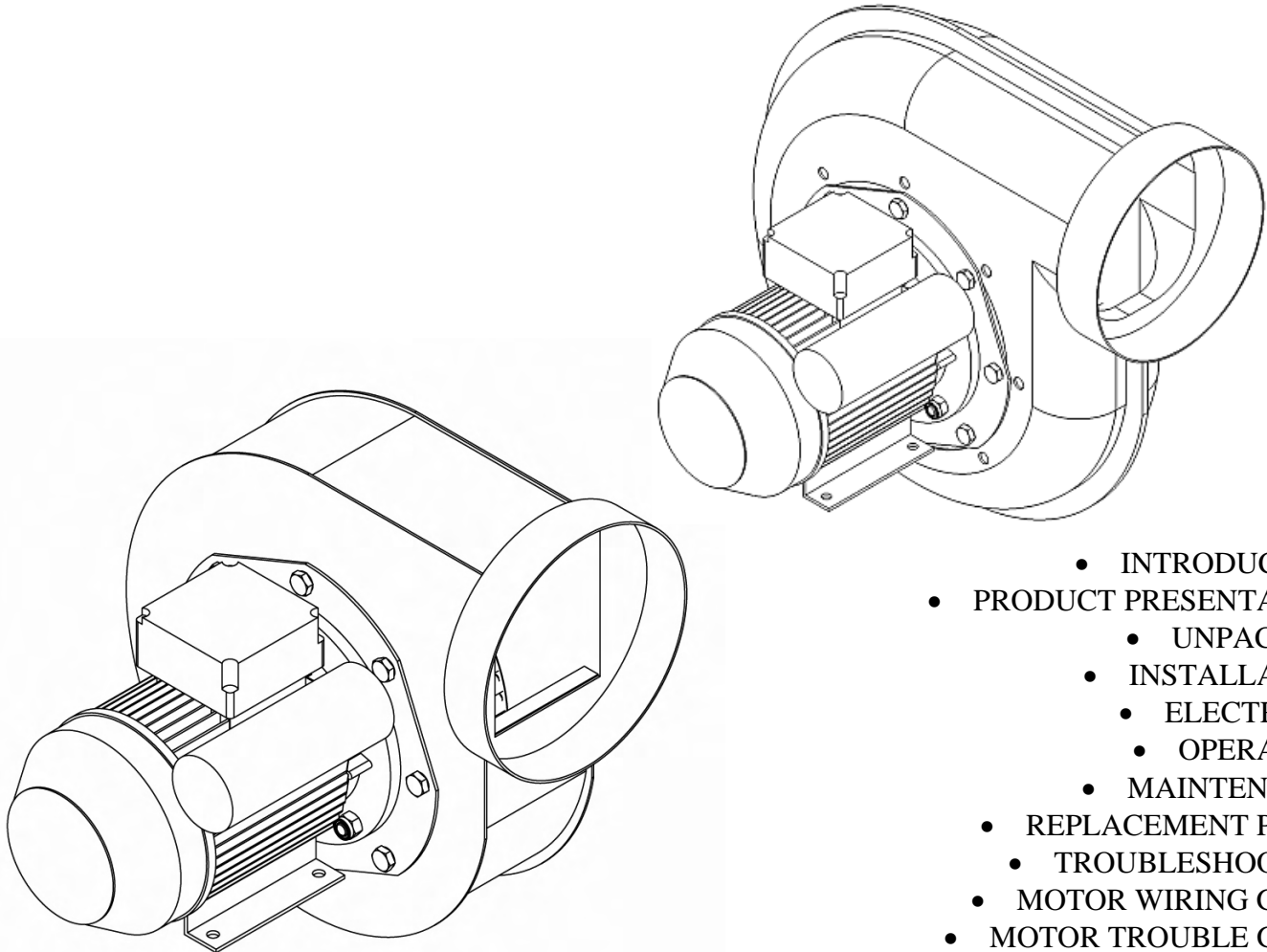


P-147 to P-154 P-Max[®] Direct Drive Fans



- INTRODUCTION
- PRODUCT PRESENTATION
 - UNPACKING
 - INSTALLATION
 - ELECTRICAL
 - OPERATION
 - MAINTENANCE
- REPLACEMENT PARTS
- TROUBLESHOOTING
- MOTOR WIRING GUIDE
- MOTOR TROUBLE GUIDE

IMPORTANT

THIS MANUAL CONTAINS PRECAUTIONARY STATEMENTS RELATING TO WORKER SAFETY. READ AND SAVE THIS MANUAL COMPLETELY AND COMPLY AS DIRECTED. ALL THE POTENTIAL HAZARDS OF DUST AND MIST CONTROL SYSTEMS AND EQUIPMENT ARE IMPOSSIBLE TO LIST; THEREFORE, OBTAIN THE SERVICES OF A PROFESSIONAL INSTALLER. A FIRE PROTECTION EXPERT SHOULD BE OBTAINED IN THE EVENT THE PRODUCT IS INTENDED FOR USES WHICH PRESENT A POTENTIAL RISK OF FIRE OR FIRE PROPAGATION. REFER TO APPROPRIATE AUTHORITIES, AND DISCUSS YOUR INTENDED USE WITH A LEV-CO REPRESENTANT. WORKERS HANDLING EQUIPMENT OR SYSTEMS SHOULD BE INSTRUCTED TO CONDUCT THEMSELVES IN A SAFE MANNER.

The logo for lev-co, featuring the text "lev-co" in white lowercase letters on a blue square background. The background of the top of the page shows a blue sky with white clouds and a green horizontal band.

lev-co

DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

A smaller version of the lev-co logo, consisting of the text "lev-co" in white lowercase letters on a blue square background.

lev-co

ALWAYS USE LEV-CO REPLACEMENT PARTS TO MAINTAIN WARRANTY.

TO ORDER SPARE PARTS CONTACT US:

1050 BROCK ROAD, Unit 22-24
Pickering, ON, CANADA L1W 3X4

Phone 905.831.7001 or 888.862.5356
Fax: 905.831.7443 or 866.840.9923

E-mail: sales@lev-co.com

Website: <http://www.lev-co.com>



TABLE OF CONTENTS

1. Safety 4

2. Product Specifications 5

3. Unpacking and Inspection 5

4. Installation..... 6

5. Electrical..... 6

6. Operation..... 7

7. Maintenance..... 8

8. Other Service 9

8. Replacement Parts 9

9. Troubleshooting..... 11

10. Motor trouble guide..... 14



SAFETY

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the occupational Safety and Health Act (OSHA).
2. Electrical wiring must be accomplished by a qualified electrician in accordance with all applicable codes.
3. The fan must be securely and adequately grounded. This can be accomplished by wiring with a grounded, metal-clad raceway system, by using a separate ground wire connected to the bare metal of fan frame, or other suitable means.
4. Always disconnect power source before working on or near a motor, or its connected load. If the power disconnect point is out-of-sight, lock it in the open position and tag to prevent unexpected application of power.
5. Be careful when touching the exterior of an operating motor; it may be hot enough to be painful or cause injury. With modern motors this condition is normal when operated at rates load and voltage; Modern motors are built to operate at higher temperatures.
6. Guard all moving parts.
7. Do not kink power cable and never allow the cable to come in contact with oil, grease, hot surfaces, or chemicals.
8. Make certain that the power source conforms to the requirements of your equipment.
9. When cleaning electrical or electronic equipment, always use an approved cleaning agent, such as dry cleaning solvent.
10. Not recommended as an explosion proof blower. Do not use where explosive fumes or gases are present.
11. Care should be taken:
 - Not to run fan above its safe speed
 - Not to operate in excessive temperatures
 - Not to operate in dangerous environments.

▲ DANGER

ALL FANS AND BLOWERS SHOWN HAVE ROTATING PARTS AND PINCH POINTS. SEVERE PERSONAL INJURY CAN RESULT IF OPERATED WITHOUT GUARDS. STAY AWAY FROM ROTATING EQUIPMENT UNLESS IT IS DISCONNECTED FROM ITS POWER SOURCE AND ALL ROTATING PARTS HAVE STOPPED MOVING. READ ALL OPERATING INSTRUCTIONS CONTAINED HEREIN BEFORE INSTALLING EQUIPMENT.

▲ DANGER

NO GUARANTEE OF ANY LEVEL OF SPARK RESISTANCE IS IMPLIED BY SPARK RESISTANT CONSTRUCTION. IT HAS BEEN DEMONSTRATED THAT ALUMINUM IMPELLERS RUBBING ON RUSTY STEEL MAY CAUSE HIGH INTENSITY SPARKS. AIR STREAM MATERIAL AND DEBRIS OR OTHER SYSTEM FACTORS MAY ALSO CAUSE SPARKS.

PRODUCT PRESENTATION

The P-Max© Fans are designed to fit extraction arms, hose reels and filter units or to be used as central fans in exhaust systems where air may contain smoke, light dust or other non-abrasive foreign materials. Not suitable for coarse material or abrasive dust. Dynamically balanced wheels. Maximum air temperature is 180°F (82°C).

INSPECTION AND UNPACKING

Inspect your LEV-CO unit for shipping damage immediately upon receipt, save all packaging materials until unit has been received, inspected and accepted. Damaged carton(s), broken crate(s), etc. are indications that the unit may have been damaged in shipment. It is also possible shipping damage may be concealed and not noticed until the unit is installed and in operation. If any damage is found, notify your delivery carrier at once and enter a claim. Claims must be filed within 15 consecutive days of receipt of shipment. **FREIGHT DAMAGE CLAIMS ARE THE RESPONSIBILITY OF THE PURCHASER, NOT LEV-CO.**

After initial inspection for shipping damage, check the cabinet filter and motor/blower compartments for any packing materials and remove.

SPECIFICATIONS

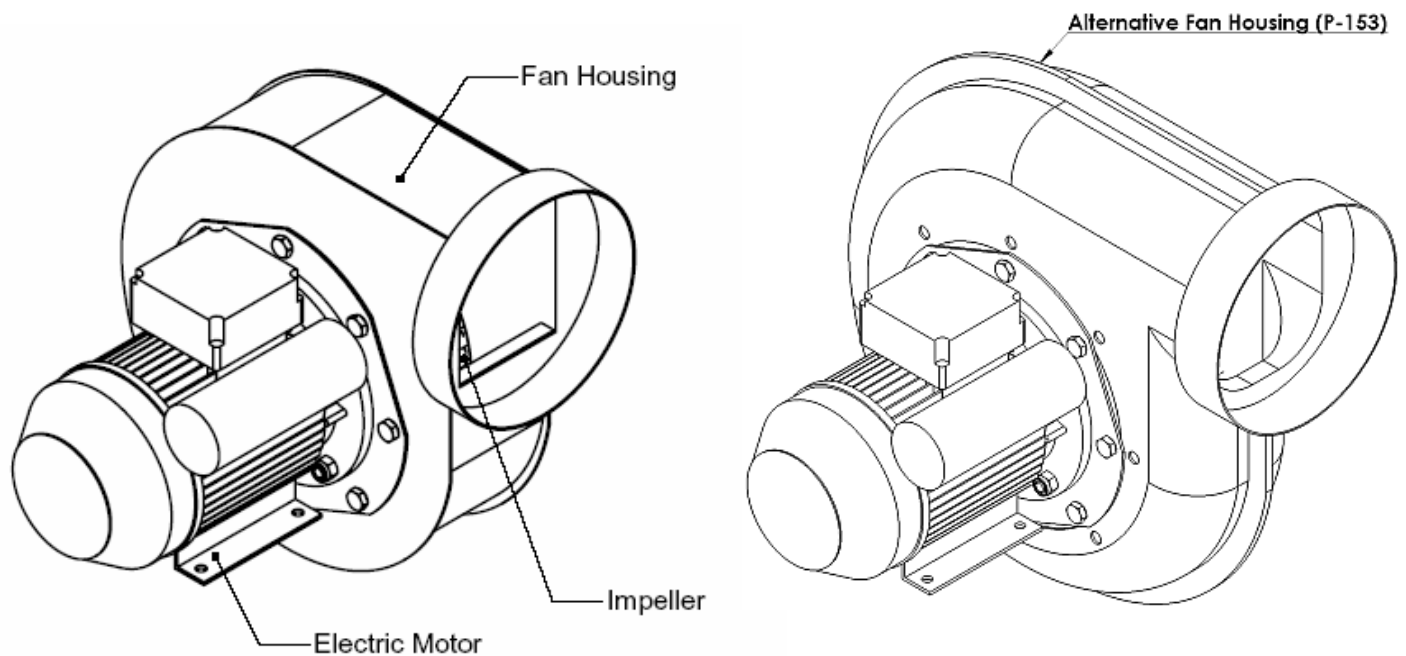


Figure 1

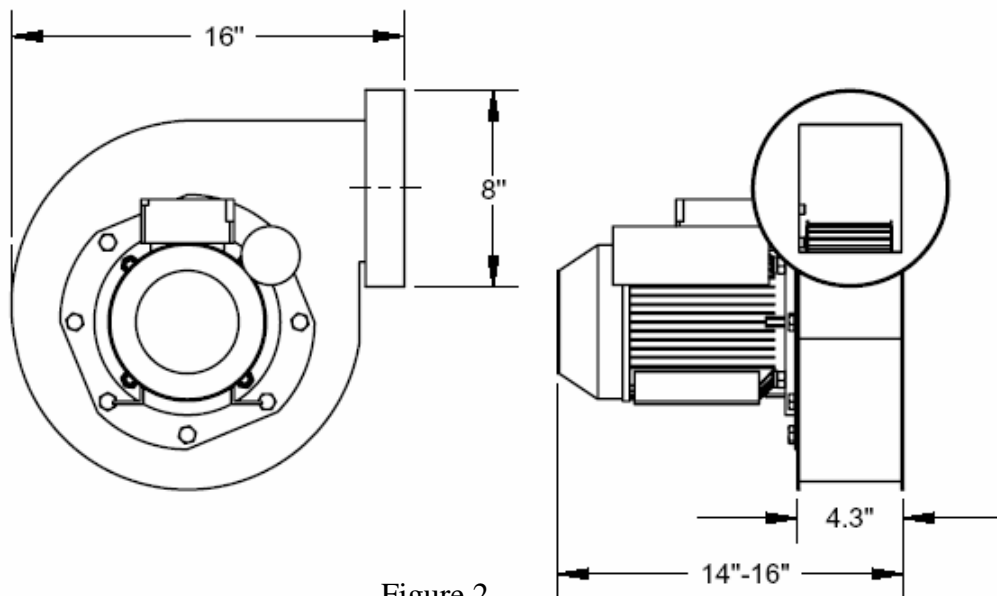


Figure 2

PRESSURE CURVES

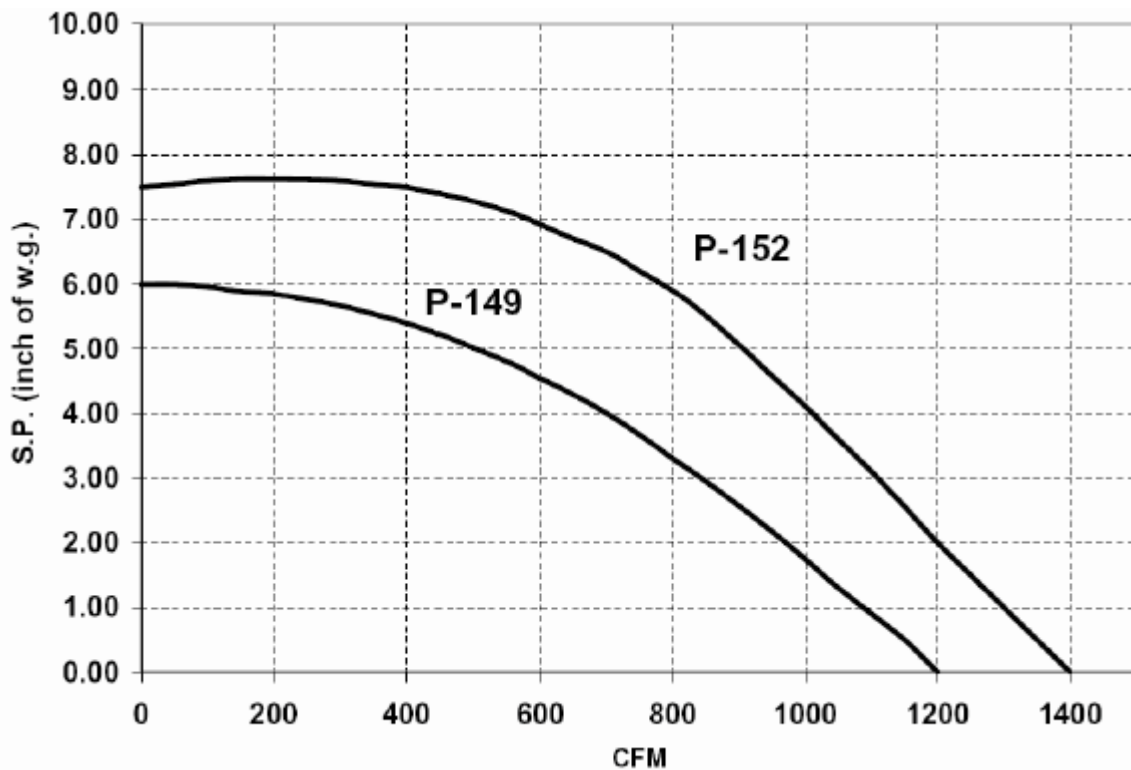


Figure 3

INSTALLATION

The installation of the fan assembly should conform to all local ordinances associated with building and electrical codes. Authorities having jurisdiction should be consulted before installation is made. If there are no local codes, the installation should conform to the National Electrical Code. Refer to the Electrical section for electrical tie in.

Check the interior of the fan to be sure it is free of debris before installing. Rotate the wheel by hand to insure that it is not rubbing or binding. If rubbing exists, loosen the set screw on the wheel and shift the wheel to obtain clearance and re-tighten the set screw.

Always use all of the mounting holes in the bracket or the installation will be unsafe. It is recommended that if mounting the bracket to a wall, the bolts go all the way through both sides and a plate or other load spreading device be used on the back wall. When mounting through a thick wall or structure, use threaded rod with a Nyloc nut and washer on each side.

ELECTRICAL

WARNING

ALWAYS DISCONNECT POWER BEFORE INSTALLING OR SERVICING ANY ELECTRICAL EQUIPMENT. FAILURE TO DO SO MAY LEAD TO SERIOUS INJURY OR DEATH.

Motor starters and disconnects are not supplied, unless ordered as an option. If these are user supplied, they must meet local and National Electrical Code standards and recommendations. Motors are typically of the multiple voltage type (e.g. 115/230 or 208/230/480). Make sure connections in motor junction box correspond to the line voltage you plan to use. Motor starters (manual or magnetic type) must have properly sized thermal overloads for the voltage and current required for the motor.

Motor checkout should be performed with the unit running and **all arms and ducts in place.** **Running the motor without the arm and duct in place may cause the motor to overload and possible motor failure, voiding warranty.** Make sure the motor current readings are equal or below motor nameplate rating. These specifications can be found on the motor.

SINGLE PHASE MOTORS

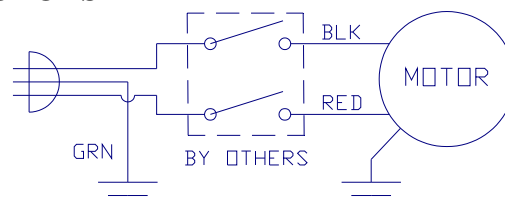


Figure 3.

The optional single phase motors available are 115/230 Volts AC. A typical wiring schematic is shown in Figure 3.

Normally motor rotation should not be changed, however, if it must be changed, reverse the two internal motor leads located under the wiring cover (see Figure 4). The motor cover plate shows an internal schematic of the motor and should be consulted for this operation.

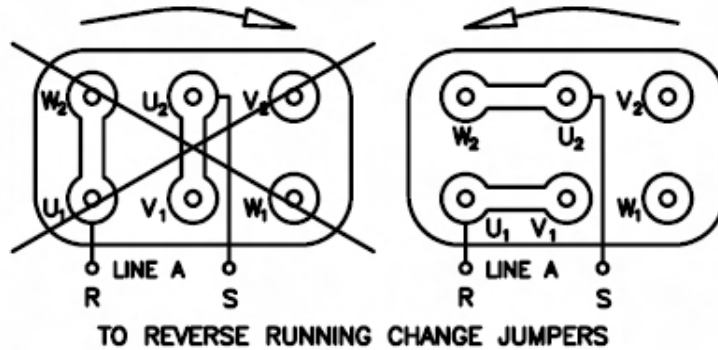


Figure 4.

THREE PHASE MOTORS

The optional three phase motors available are 208-230/460 Volts AC. The motor does not have overload protection included in the standard configuration and must be supplied by the customer if not ordered from the factory. If these protective circuits are not ordered from the factory, use equipment as specified by the National Electric Code or other applicable authority.

The main power leads, L1, L2, L3 are not differentiated by color. If motor rotation must be changed, then reversing any two of the leads will produce this result (e.g. reverse L1 and L2 or L2 and L3). Figure 5 illustrates the line connections used and wiring configuration as reflected on the motor name plate of three phase motors. **Check the motor plate before changing voltage settings.**

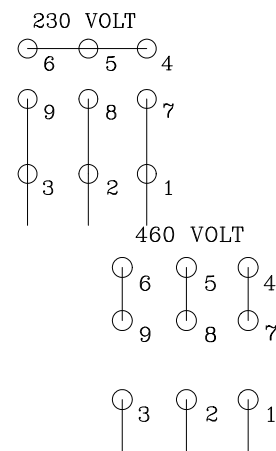


Figure 5.

OPERATION

When the electrical hookups are completed, "bump" the starter switch and check for correct motor rotation (see Figure 6). If the motor is operating backwards, switch two of the leads as shown for single phase motors. For three phase motors switch any two of the motor leads. Refer to the diagram on the motor.

After installation is completed, turn **ON** blower and take an amp reading on each motor lead. Check the motor amps against the nameplate FLA (Full Load Amps) to insure motor is operating correctly. Record this information in the Notes section for future reference. If the motor is over-amping, shut it **OFF** immediately and see the Troubleshooting section or the Motor Wiring Guide located in the Appendix.

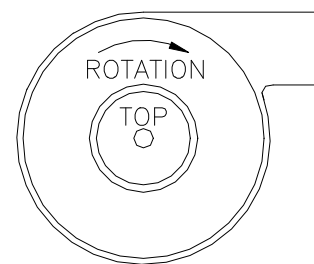


Figure 6.

MAINTENANCE

WARNING!

ALWAYS DISCONNECT THE UNIT FROM ALL ENERGY SOURCES BEFORE WORKING ON OR NEAR THE MOTOR OR WIRING ASSEMBLIES. LOCK OUT DISCONNECTS TO PREVENT UNEXPECTED APPLICATION OF POWER

1. Periodically remove dirt from blower wheel and housing.
2. Check tightness of wheel set screw.
3. After disconnecting the power source, check the wiring to see if it is secure and well insulated.
4. Re-lubricate motor per manufacturer's instructions (when required)
5. Remove any access lubricants
6. Check amperage (should not exceed nameplate)
7. Measure flow rate in order to determine that the blower is delivering the required flow rate

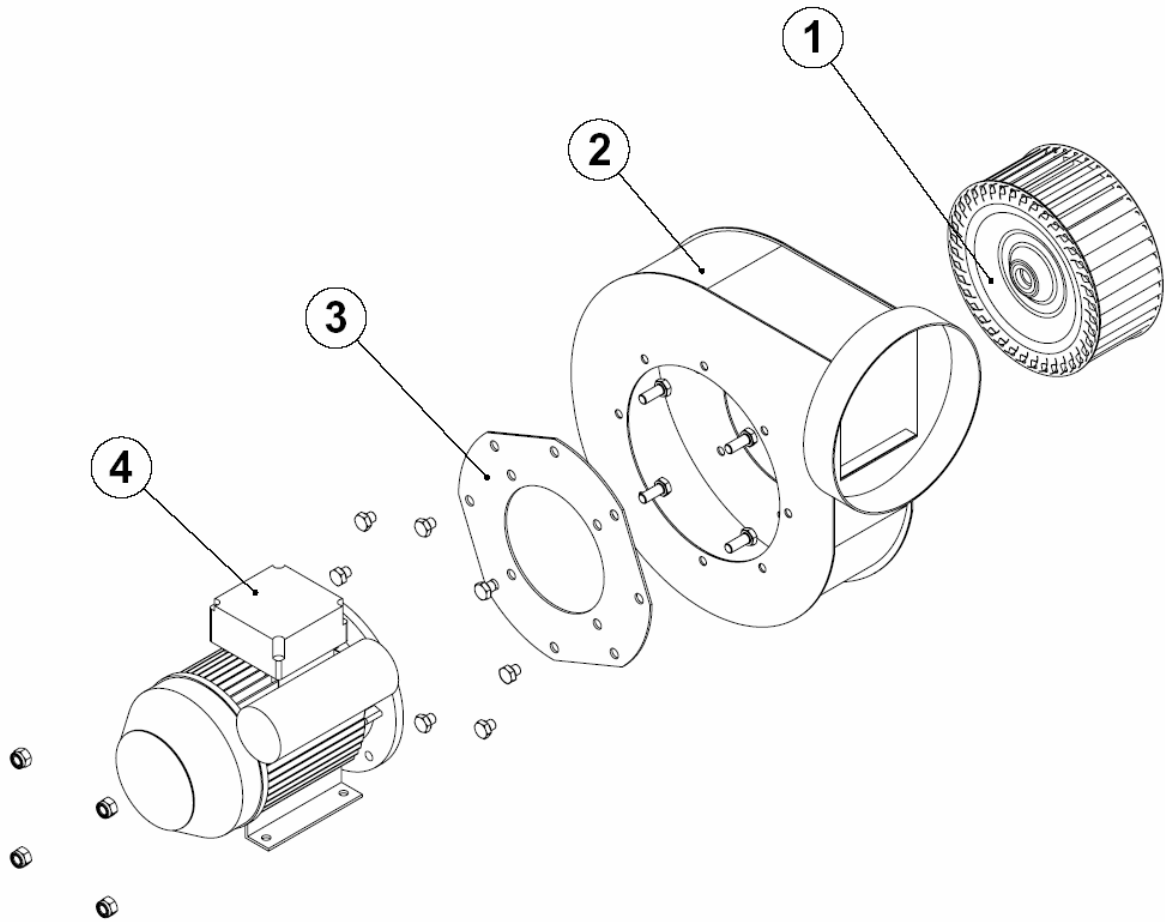
OTHER SERVICE:

Most other components of your P-Max© require little or no routine servicing. Items such as motors, blower wheels should be checked twice a year under normal usage (more frequently under severe 24hr-per-day usage). Clean, repair, or replace parts as necessary. Check for dirt build-up on blower wheel and other rotating parts which can cause imbalance and resultant vibration, noise, and short bearing life, and clean as necessary.

REPLACEMENT PARTS

Listed below are part numbers for the P-Max© Fan. Use the following section for parts replacement.

ITEM	QTY	PART #	DESCRIPTION
1a	1	P-149-9	(R-035) Impeller for P-149 series fans
1b	1	P-149-AL	Impeller for P-152 series fans
2	1	P-149-8	Universal Fan Housing for P-149 and P-152 series fans
3	1	P-149-10	Universal Motor Plate for P-149 and P-152 series fans
4a	1	P-150-4	1HP 3600 RPM TEFC Motor C Flange CSM Motori
4b*	1	FC000402	1HP, 3600RPM, C Flange, 230/460/3/60 TEFC, 56 Frame
4c*	1	FC000502	1HP, 3600RPM, C Flange, 575/3/60 TEFC, 56 Frame
4d	1	FC001102	1.5HP, 3600RPM, C Flange, 115-230/1/60 TEFC, 56 Frame
4e	1	FC002402	2HP, 3600RPM, C Flange, 230/460/3/60 TEFC, 56 Frame
4e	1	FC002502	2HP, 3600RPM, C Flange, 575/3/60 TEFC, 56 Frame
n/s	1	P-149-Sleeve	Sleeve for FC00402 and FC00502
n/s	1	P-149-key	Key for FC00402 and FC00502



TROUBLESHOOTING

The troubleshooting guide included in this manual is for qualified personnel only. A Motor Trouble Guide is included in Appendix A. If the unit does not function properly after following the guidelines in this manual, consult LEV-CO for further help.

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Motor won't operate	Motor overload Failed motor Starter failure No input voltage	- Too much airflow. Be sure arm, hose, and doors are installed before running. - Replace motor. Check amps to ensure proper operation. - Check overload reset. Check magnet coil for failure - Check circuit breaker
2. Motor runs, then trips out overload or blows fuses	Voltage source inadequate Static load on blower too low	Check voltage at motor with motor running. Voltage should be +/- 10% of motor rating. If not, check: 1. Power source 2. Wire size from source Check running amps of motor. If at or below amps indicated on unit nameplate, check fuse size or overload sizing/adjustment. Increase system duct inlet resistance (more air)
3. Low air flow	Motor running backwards Motor running slow	Check rotation. Check line voltage. Check motor current



RECORD START UP DATA HERE

MODEL: P-Max Fan

SERIAL NO.: _____

DATE PURCHASED: _____

DATE INSTALLED: _____

MOTOR VOLTAGE (MEASURED): _____

MOTOR CURRENT (MEASURED): _____

MOTOR FLA (FROM NAMEPLATE): _____

MOTOR VOLTAGE (FROM NAMEPLATE): _____

ALWAYS USE LEV-CO REPLACEMENT PARTS AND FILTERS TO MAINTAIN WARRANTY

TO ORDER SPARE PARTS CONTACT LEV-CO

1050 BROCK ROAD, Unit 22-24
Pickering, ON, CANADA L1W 3X4

Phone 905.831.7001 or 888.862.5356
FAX: 905.831.7443 or 866.840.9923

E-MAIL: sales@lev-co.com

INTERNET: <http://www.lev-co.com>

MOTOR TROUBLE GUIDE

The purpose of this guide is to suggest common answers to electrical problems. The information is not all-inclusive and does not necessarily apply in all cases. When unusual operating conditions, repetitive failures, or other problems occur, consult an electric motor service firm for assistance.

TROUBLE	CAUSE	WHAT TO DO
MOTOR FAILS TO START	<ol style="list-style-type: none"> 1. Blown Fuses. 2. Low voltage. 3. Improper line connections. 4. Overload (thermal protector) tripped. 5. Motor may be overloaded. 6. If permanent split capacitor motor, capacitor may be open. 7. Defective motor or starter. 	<ol style="list-style-type: none"> 1. Replace with time-delay fuses or circuit breakers. Check for grounded winding. 2. Use higher voltage tap on transformer terminals, increase wire size. Check for poor connections. 3. Check connections against diagram supplied with motor. 4. Check and reset overload relay in starter. Check heater rating against motor nameplate current rating. Check motor load. If motor has manual reset thermal protector, check if tripped. 5. Reduce load. Increase motor size. 6. Indicated by humming sound. Replace run capacitor. See nameplate for correct value. 7. Repair or replace.
MOTOR STALLS	<ol style="list-style-type: none"> 1. Overloaded motor. 2. Low motor voltage. 	<ol style="list-style-type: none"> 1. Reduce load or increase motor size. 2. See that nameplate voltage is maintained.
MOTOR DOES NOT COME UP TO SPEED	<ol style="list-style-type: none"> 1. Not applied properly. 2. Voltage too low at motor terminals due to line drop. 3. Load too high. 	<ol style="list-style-type: none"> 1. Consult motor service firm for proper type. Use larger motor. 2. Use higher voltage tap on transformer terminals, increase wire size. Check for poor connections. 3. Check load motor is carrying at start-replace with larger motor.
MOTOR TAKES TOO LONG TO ACCELERATE	<ol style="list-style-type: none"> 1. Excess Loading; high inertia load. 2. Inadequate wiring. 3. Applied voltage too low. 4. Defective motor. 5. Inadequate starting torque. 	<ol style="list-style-type: none"> 1. Reduce load. Increase motor size. 2. Increase wire size. Check for poor connections. 3. Reconnect to a higher transformer tap. Increase wire size. Check for poor connections. 4. Repair or replace. 5. Replace with higher horsepower motor.
MOTOR VIBRATES OR IS EXCESSIVELY NOISY	<ol style="list-style-type: none"> 1. Motor mis-aligned. 2. High voltages 3. Worn, damaged, dirty or overloaded bearings. 4. Loose or defective or out-of-balance air mover. 	<ol style="list-style-type: none"> 1. Realign. 2. Check wiring connections, transformer. 3. Replace, check loading and alignment. 4. Tighten set screw(s); repair or replace.
INSUFFICIENT SPEED CHANGE	<ol style="list-style-type: none"> 1. Insufficient motor load. 	<ol style="list-style-type: none"> 1. Use a lower horsepower motor. 2. Reduce system restrictions (blower). Increase system restriction (propeller fan).
MOTOR OVERHEATS WHILE RUNNING UNDER LOAD	<ol style="list-style-type: none"> 1. Overload. 2. Dirt preventing ventilation. 3. Faulty connection. 4. High or low voltage. 5. Defective motor. 	<ol style="list-style-type: none"> 1. Reduce load; increase motor size. 2. Clean motor. 3. Clean, tighten or replace. 4. Check voltage at motor, should not be more than 10% above or below rated. 5. Repair or replace

WARRANTY & GUARANTEE

It is our goal, as The Local Exhaust & Ventilation Company of Canada (LEV-CO), to ensure customer satisfaction with each and every recommendation and/or sale to our valued clients. We have, therefore, prepared this simple policy.

1. All LEV-CO products carry a three (3) year limited warranty, effective from date of shipment.
2. As a reputable supplier, LEV-CO, guarantees the satisfaction of the customer for LEV-CO designed systems. If the products and or systems do not meet the customer's satisfaction with the first 30 days, LEV-CO shall repair or replace the product, adjust the installation or refund the client, at LEV-COs discretion, in order to ensure the customer is satisfied.
3. For filtration systems, it is the client's responsibility to purchase replacement filters from LEV-CO. If not, warranty on the filtration system will be void due to improper filter selection causing poor performance and even hazardous conditions. (i.e. filter surface area, construction, media type, explosive hazards, etc.)
4. In no event shall LEV-CO be liable for consequential or special damages and charges, which may arise in connection with such products. The warranty is waived for any misuse or abuse of product.

LIMITED U.S.A. / CANADA WARRANTY

Lev-co warrants to the original purchaser, subject to the conditions and exceptions below, that should the Product covered by this warranty (Product) fail to perform by reason of defects in material or workmanship, Lev-co will, during the period of three years from the date of original purchase, either, (i) replace the Product or (ii) provide all necessary parts to repair the Product, without charge, EXCEPT that such warranty does not apply to filter elements or normal wear items such as rubber and plastic gaskets, hose, and friction discs which Lev-co will replace without charge only during the period of 30 days from the date of original purchase. Motor/blowers have a one (1) year limited warranty. Lev-co provides no other warranty, express or implied. Under warranty, the decision whether to replace the Product or the necessary parts shall rest solely with Lev-co.

EXCEPT to the extent prohibited by applicable law, all implied warranties made by Lev-co, in connection with the Product covered hereunder, including the warranties of merchantability and fitness, are limited in duration to a period of three (3) years from the date of original purchase, and no warranties, whether express or implied, including said warranties of merchantability, shall apply to this Product after said period. Should the Product covered hereunder prove defective in workmanship or material, the consumers sole remedy shall be such repair or replacement as is expressly provided above, and under no circumstances shall Lev-co be liable for any loss or damage, direct or consequential, arising out of the use of, or inability to use, the Product covered hereunder.

This warranty is valid only for Products installed in the U.S.A. / Canada under the following conditions:

CONDITIONS

- **REGISTRATION:** The purchasers completion and mailing of the registration card below to Lev-co (address: Lev-co, 1050 Brock Rd. , Units 22-24, Pickering , ON , L1W 3X4) within 30 days of original purchase.
 - **AUTHORIZATION:** Purchaser will contact Lev-co, (905) 831-7001 for authorization and returned goods (RG) number and shipping address. Lev-co will direct purchaser to either return necessary parts, or the Product at Lev-co option. All returned parts must have an RG number from Lev-co.
 - **PROPER DELIVERY:** The shipping, freight prepaid, or delivery of the parts or the Product, to Lev-co in either its original carton or in a carton assuring similar protection of the Product, with returned goods (RG) number clearly displayed on outside of carton.
 - **UNAUTHORIZED REPAIR:** A showing by the original purchaser that the Product has not been altered, repaired, or serviced by anyone other than an authorized serviceman using genuine Lev-co parts.
 - **UNAUTHORIZED PARTS:** A showing by the original purchaser that the Product has had only genuine Lev-co parts and filters used in the operation and maintenance.
- SERIAL NUMBER INTACT:** A showing by the original purchaser that the Serial Number has not been altered or removed.
- **MISUSE:** A showing by the original purchaser that the Product has not been involved in an accident, freight damage, misused, abused or operated contrary to the instructions contained in the owners' manual.
 - **FOB - Pickering.** All Taxes Extra. Prices are subject to change without notice.
 - **TERMS - Net 30 days,** subject to approved credit

©The Local Exhaust and Ventilation Company Inc. 2005