

BLACKMER ENTERPRISE BLOWERS

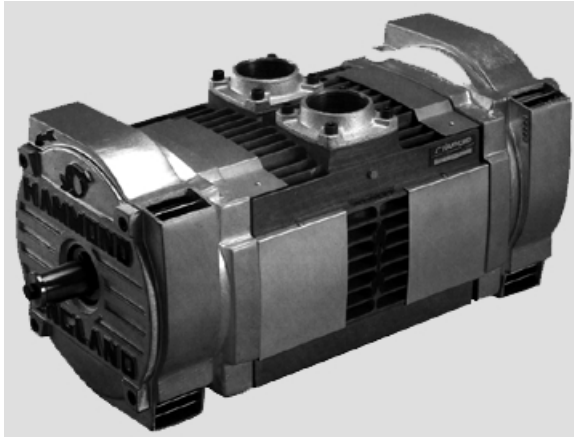
INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

MODELS: E352, E502

Discontinued Models

969804
INSTRUCTIONS NO. 288/B_aug98

Section	200
Effective	August 1998
Replaces	New



SAFETY DATA

NOTICE:

Blackmer truck mounted Enterprise blowers **MUST** only be installed in systems which have been designed by qualified engineering personnel. The system **MUST** conform to all applicable local and national regulations and safety standards.

This manual is intended to assist in the installation and operation of the Blackmer Enterprise blowers, and **MUST** be kept with the blower.

Blackmer blower service and maintenance shall be performed by qualified technicians **ONLY**. Service and maintenance shall conform to all applicable local and national regulations and safety standards.

Thoroughly review this manual, all instructions and hazard warnings, **BEFORE** performing any service or maintenance on the Blackmer blowers.

Maintain **ALL** system and Blackmer blower operation and hazard warning decals.

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This is a SAFETY ALERT SYMBOL.

When you see this symbol on the product, or in the manual, look for one of the following signal words and be alert to the potential for personal injury, death or major property damage.

▲ DANGER

Warns of hazards that **WILL** cause serious personal injury, death or major property damage.

▲ WARNING

Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

▲ CAUTION

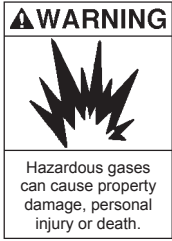
Warns of hazards that **CAN** cause personal injury or property damage.

NOTICE:

Indicates special instructions which are very important and must be followed.

NOTE: Numbers in parentheses following individual parts indicate reference numbers on the corresponding Blackmer Blower Parts List 288/B1.

SAFETY DATA



COMPRESSING GASES INTO A VESSEL CONTAINING FLAMMABLE OR EXPLOSIVE GASES, OR COMPRESSING FLAMMABLE OR EXPLOSIVE GASES, CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



FAILURE TO INSTALL ADEQUATELY SIZED PRESSURE RELIEF VALVE(S) CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



BLOWER, PIPING AND ACCESSORIES WILL BECOME HOT DURING OPERATION AND CAN CAUSE SERIOUS PERSONAL INJURY.

NOTICE:

BLACKMER ENTERPRISE BLOWERS ARE NOT DESIGNED FOR HANDLING LIQUID OR CONDENSATE. TO DO SO WILL VOID THE WARRANTY.

NOTICE:

ROTATION MUST MATCH ARROWS CAST ON BLOWER BODY. REVERSE ROTATION WILL SEVERELY DAMAGE BLOWER AND VOID WARRANTY.

SAFETY CHECKLIST

1. Before operating the blower, ensure the vessel to which the blower is connected is certified to withstand the pressure and /or vacuum produced.
2. Verify adequately sized relief valves have been fitted to protect the vessel.
3. Gas/air mixtures which are potentially volatile/explosive must not be introduced or allowed to be introduced into the blower.
4. All pressure vessel and piping connected to the blower must be isolated and in a safe operating condition.
5. Operators should wear ear protection when operating truck mounted blowers.
6. There are components within the blower of sufficient weight to cause injury if mishandled. An M12 eye bolt can be fitted between the inlet and discharge ports. This lifting point is for lifting the blower only. Do not attempt to lift the machine and piping from this point.
7. Where necessary, this equipment should be grounded to control static electricity.
8. The temperature of the air leaving the blower is elevated above ambient due to air compression. Check that the elevated temperatures do not adversely affect the product and any material used in design of the system. Attach clearly marked warning signs to warn of potentially hot surfaces on the blower, piping and accessories which will burn if touched.
9. Mounting of the blower must be correctly engineered and the blower must be properly secured. Refer to the Blower Mounting section of this manual.

TECHNICAL DATA

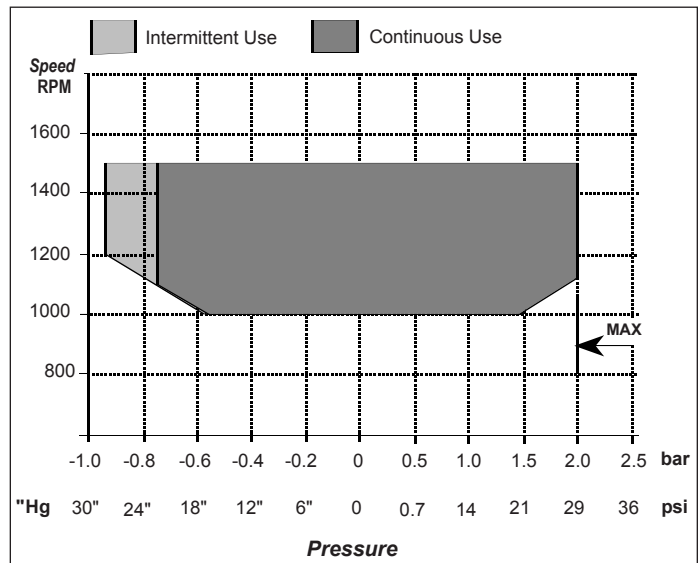
	E352 Models	E502 Models
Maximum Air	242 cfm (411 m ³ /hr)	318 cfm (540 m ³ /hr)
Weight	238 lbs. (108 kgs.)	293 lbs. (133 kgs.)
Power Absorbed*	37 hp (28 kW)	48 hp (36 kW)
Maximum Pressure	29 psi (2.0 bar)	
Maximum Blower Speed	1000 - 1500 RPM	
Standard Rotation ¹	Counterclockwise	

* @ Maximum Pressure - 1500 rpm

¹ Clockwise rotation optional - must be specified at time of order.

NOTICE:

BLOWER SPEED AND PRESSURE MUST FALL WITHIN THE SHADED AREA OF THE GRAPH AT RIGHT.

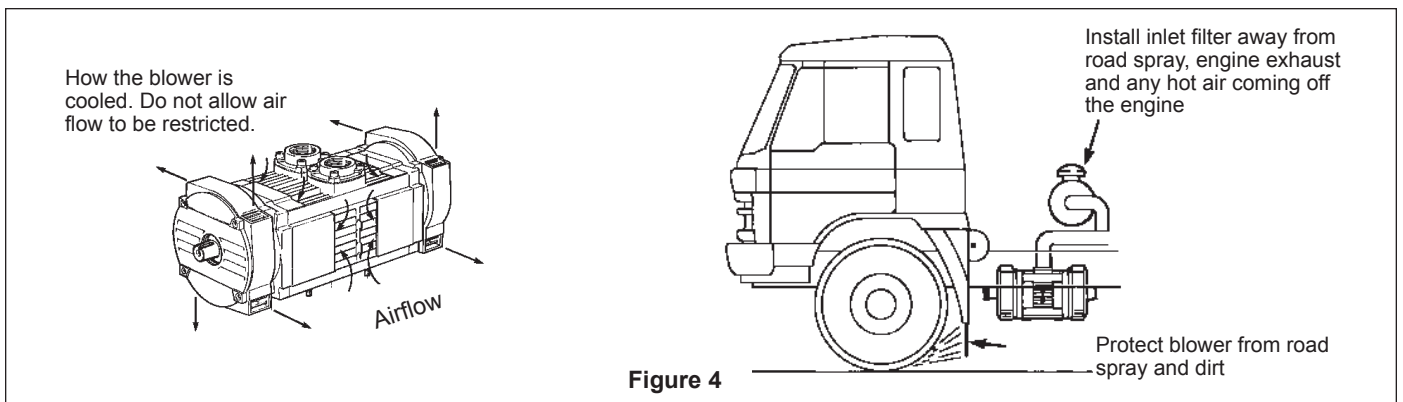
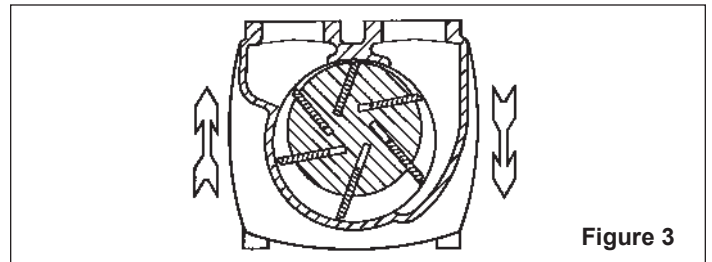
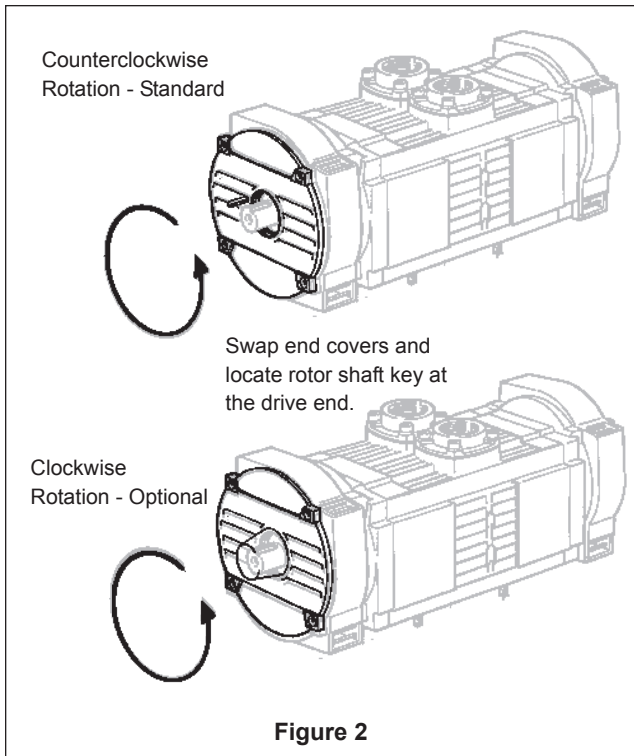
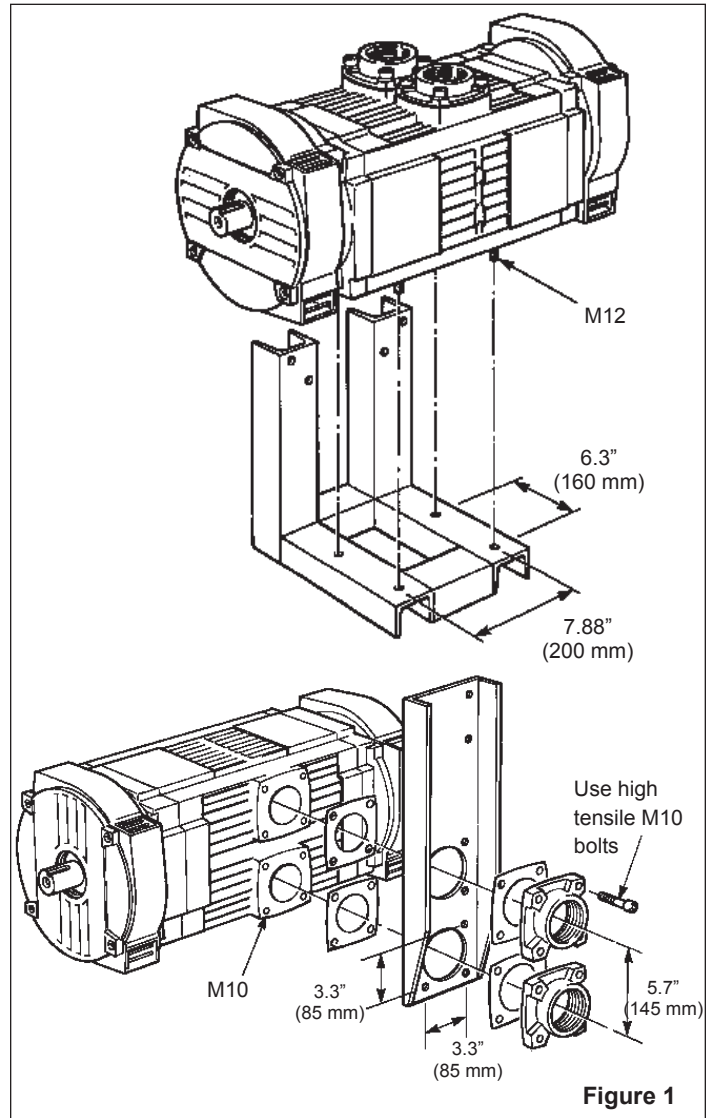


Blower Operating Limits

INSTALLATION

BLOWER MOUNTING

1. It is recommended the blower be mounted standing on its feet, but the blower may also be suspended or on its side, using the studs provided. It may also be mounted from the suction and delivery flanges, but all eight M10 holes must be used with high tensile bolts. See Figure 1.
2. The blower can be turned end for end to suit the drive direction, however the drive shaft must always be horizontal. See Figure 2.
3. Ensure that the blower rotates in the direction of the arrows cast on the body. DO NOT confuse the logo on the blower for the direction of rotation. See Figure 3.
4. Install the blower on the vehicle in a position where dirt cannot clog the fins or cooling outlets. See Figure 4. On a regular basis the cooling fans and exterior surfaces should be cleaned. After cleaning, the blower should be run for 15 minutes to remove any water that may have entered the piping.



INSTALLATION

DRIVE SYSTEMS

A variety of drive options are available for the blower, including vehicle mounted, drive shaft, hydraulic motor and flexible coupling. CAREFULLY follow all the recommendations provided here for your application. In ALL cases, the drive shaft MUST be capable of providing for a constant blower speed and MUST NOT subject the blower to excessive start-up torques.

DRIVER - VEHICLE MOUNTED

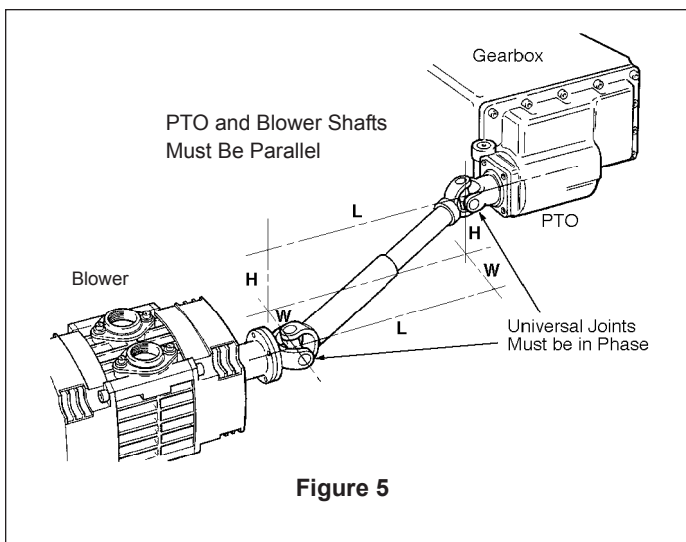
1. Speed governors are required.
2. Power Take-off (PTO) MUST provide for the correct blower operating speed.
3. If PTO gear box has a "High/Low" range, ensure that the correct range is selected.

DRIVE SHAFT - See Figure 5



DRIVE SHAFTS MUST BE GUARDED IF EXPOSED. OPERATION WITHOUT GUARDS CAN CAUSE SERIOUS PERSONAL INJURY, MAJOR PROPERTY DAMAGE OR DEATH.

1. Square slip joints are NOT recommended.
2. Drive shaft length should be as short as possible and the drive shaft MUST be balanced.
3. The drive shaft and blower shaft MUST be parallel within 1° and have a maximum of 10° compound misalignment. See Table 1.
4. Universal joints MUST be in phase, with the drive shaft slip joint at mid-position. Use an even number of universal joints.
5. If the drive shaft is fitted to a PTO, a torque limiting device MUST be fitted to prevent damage due to possible blower failure/seizure.



Value A (In)	Angle of Drive Shaft	
0.017	1°	Very Good
0.035	2°	
0.052	3°	
0.070	4°	
0.087	5°	
0.105	6°	Good
0.125	7°	
0.141	8°	
0.158	9°	
0.176	10°	
0.194	11°	Danger
0.213	12°	
0.231	13°	
0.249	14°	
0.268	15°	

Table 1

$$A = \frac{\sqrt{H^2 + W^2}}{L}$$

When H=Zero $A = \frac{W}{L}$

When W=Zero $A = \frac{H}{L}$

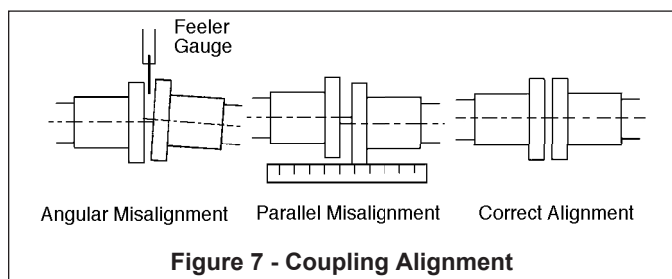
HYDRAULIC DRIVE

1. If the blower is to be driven hydraulically, Blackmer can supply a special adapter trunk to allow direct coupling of most hydraulic motors. **Check coupling alignment and spacing before operation.**
2. Blackmer can supply the complete hydraulic drive system including the Hydrive hydraulic cooler and drive unit. The Hydrive, when connected to the hydraulic pump and motor forms a complete hydraulic drive system.

DIRECT DRIVE - FLEXIBLE COUPLING

When directly coupled to a driver, use a flexible coupling.

1. Coupling angular and parallel alignment MUST be maintained in accordance with coupling manufacturer's instructions. See Figure 7.



2. Coupling flange MUST be a slide fit over the blower shaft.

NOTICE:

USE OF EXCESSIVE FORCE WHEN FITTING THE COUPLING FLANGE TO THE BLOWER SHAFT CAN CAUSE BEARING DAMAGE AND INTERNAL BLOWER DAMAGE.

3. When an electric motor is utilized as the driver, it MUST be fitted with adequately sized overload protectors to safeguard it against blower seizure.
4. An unloading valve should be fitted if starting against pressure.
5. Ensure both blower and driver (prime mover) are rigidly fixed to the same baseplate.

INSTALLATION

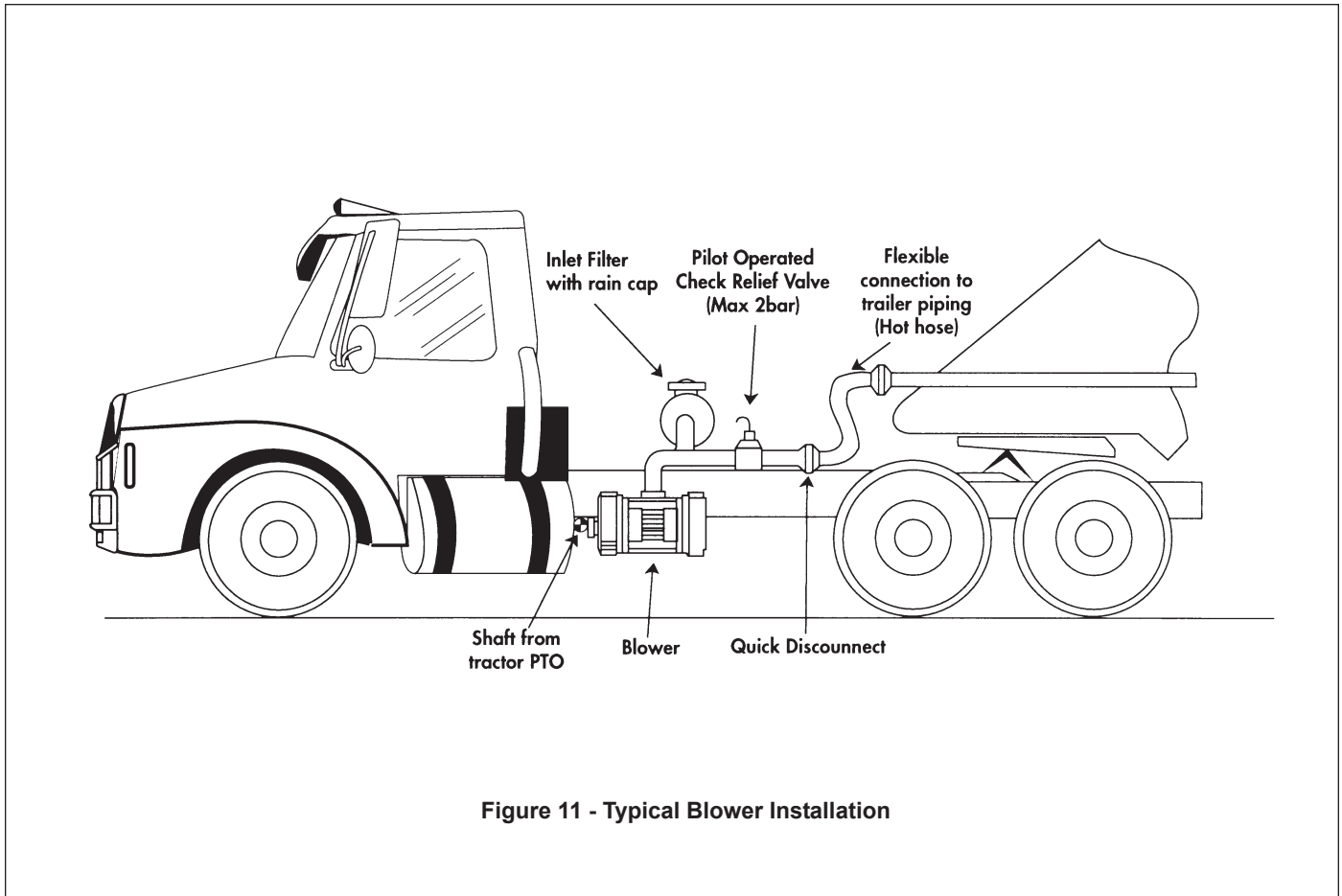


Figure 11 - Typical Blower Installation

PIPING

1. Piping **MUST** be **at least as large** as the blower suction and discharge connections.
2. ALL piping **MUST** be adequately supported to prevent any piping loads from being placed on the blower.
3. It is recommended that flexible pipes are fitted on either side of the blower to reduce vibration and noise.
4. A “tee” and a vent valve should be fitted to the discharge pipe, so that air from the blower and/or the tank can be vented to atmosphere. Ensure this vented air is directed down to the ground.
5. Blower and discharge piping will become hot during operation, and will burn if touched. Adequate precautions should be taken to prevent access, and suitable warning labels should be displayed.
6. The blower must have an adequately sized pressure relief valve installed immediately after the blower discharge.
7. Blackmer pilot operated relief/check valves are available. Install relief/check valve with three feet (1 meter) of straight pipe directly before the valve. The relief/check valve **MUST** be mounted in a way to prevent debris from falling into the blower.
8. Verify all components are capable of operation at the maximum system pressure limits and that the vessels are adequately protected by **SEPARATE** relief valves of adequate size.
9. For additional recommendations in the piping and installation of the blower refer to Figure 11 (above) - “Typical Blower Installation” and the following “Accessories” section of this manual.

INSTALLATION

ACCESSORIES

For full details and part numbers of the following accessories, refer to the corresponding Blackmer Blower Parts List.

Inlet Air Filter - Figure 12

1. The suction side of the blower should be fitted with an inlet air filter supplied or recommended by Blackmer otherwise the warranty will be void.
2. When fitting the air filter, it must be isolated from any intake of water or road spray.
3. Mount the inlet filter with the Rain cap on the top and the dump valve facing the ground (in the 6 o'clock position).
4. DO NOT mount filter where exhaust fumes can be drawn into the filter.

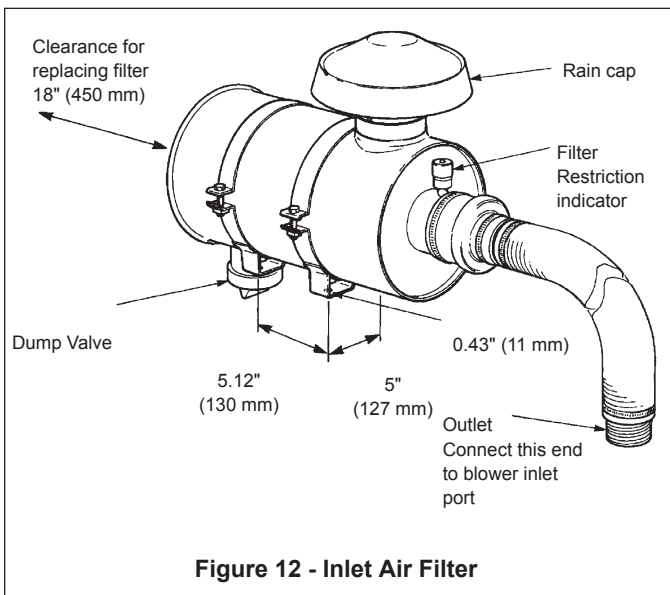


Figure 12 - Inlet Air Filter

Relief /Check Valve - Figure 13

1. The blower MUST be equipped with a pressure relief valve set to the maximum pressure recommended for the blower, and a check valve immediately after the discharge port before any other equipment is fitted.

NOTICE:

THE MAXIMUM SETTING OF THE PRESSURE RELIEF VALVE IS 29 PSI (2.0 BAR).

2. The Blackmer combined relief/check valve should be installed immediately after the blower. However, it should NOT be mounted directly onto the discharge port as this close proximity can damage the check valve causing broken parts to drop into the machine and voiding the warranty. Install the relief/check valve at least 3 feet (1 meter) downstream from the blower.

3. If painting the blower or surrounding area, completely mask relief/check valve as paint will prevent correct operation. Remove the masking before operation.

To Set Relief Valve:

1. Loosen the locknut (26).
2. Screw the fitting (20) *counterclockwise* to **lower** the pressure or *clockwise* to **increase** the pressure.

Always make adjustment in conjunction with a pressure gauge fitted to the discharge port of the blower.

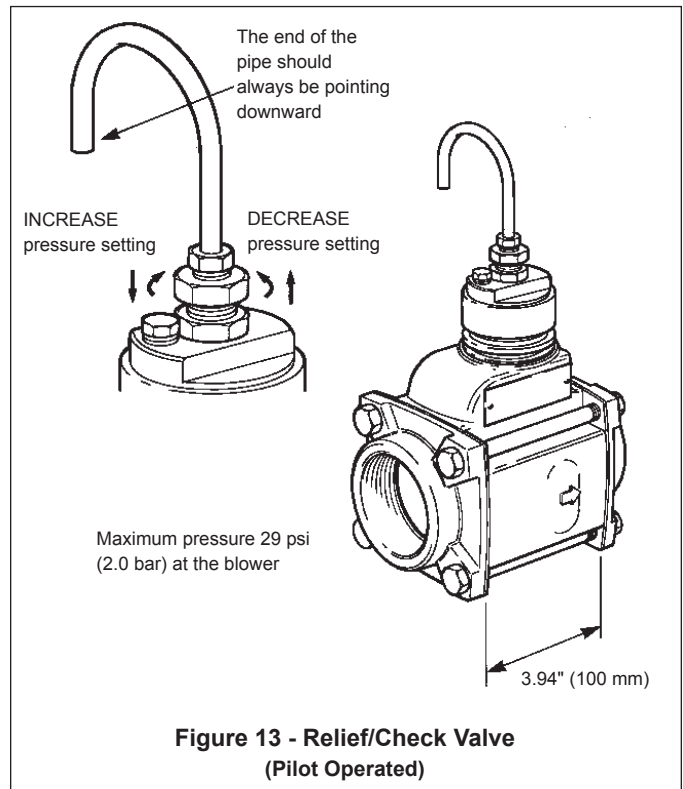
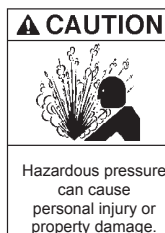
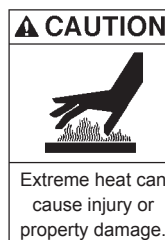


Figure 13 - Relief/Check Valve
(Pilot Operated)



FAILURE TO INSTALL ADEQUATELY SIZED PRESSURE RELIEF VALVE(S) CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



AIR BLOWN THROUGH THE RELIEF VALVE WILL BURN IF TOUCHED. THE VALVE CASE WILL BE HOT DURING OPERATION AND FOLLOWING USE. ALLOW TO COOL BEFORE HANDLING.

OPERATION

⚠ WARNING



Hazardous gases can cause property damage, personal injury or death.

COMPRESSING GASES INTO A VESSEL CONTAINING FLAMMABLE OR EXPLOSIVE GASES, OR COMPRESSING FLAMMABLE OR EXPLOSIVE GASES, CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

NOTICE:

FAILURE TO OPERATE BLOWER WITHIN THE SHADED LIMITS INDICATED IN TECHNICAL DATA SECTION, CAN RESULT IN BLADE BOUNCE, EXCESSIVE BLADE WEAR, CHIPPING OR BREAKAGE.

NOTICE:

REVIEW SAFETY DATA SECTION OF THIS MANUAL AND FOLLOW ALL HAZARD WARNINGS AND NOTICES BEFORE OPERATING BLOWER.

NOTICE:

BLOWER MUST OPERATE AT FIXED SPEED BETWEEN 1000 RPM AND 1500 RPM. SPEED MUST REMAIN CONSTANT THROUGHOUT THE DISCHARGE.

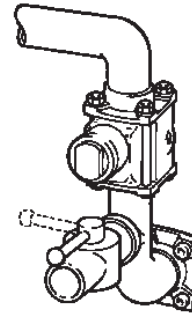
NOTICE:

ROTATION MUST MATCH ARROWS CAST ON BLOWER BODY. REVERSE ROTATION WILL SEVERELY DAMAGE BLOWER AND VOID WARRANTY.

BLOWER START UP PROCEDURE - Vehicle Mounted

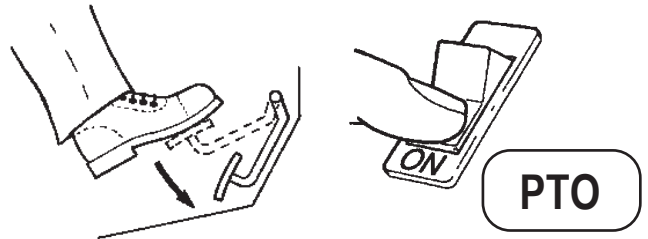
STEP 1

- BEFORE starting blower, open all air valves necessary to vent the tank and blower to atmosphere.
- Verify there is no possibility of operating at pressure before blower reaches correct speed.



STEP 2

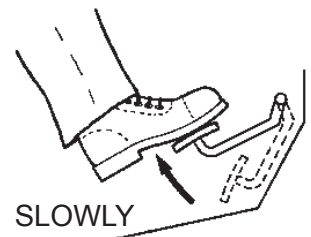
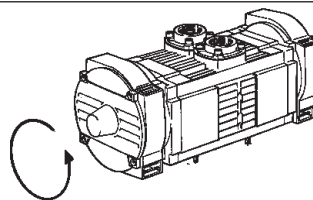
- Start vehicle engine and run at idle speed.
- Depress clutch and engage PTO.



STEP 3

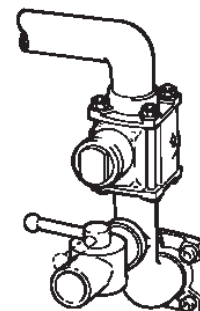
- The engine should be equipped with an automatic speed control device. If not, set engine speed to give correct blower speed BEFORE releasing the clutch.
- Release the clutch SLOWLY.

MAX - 1500 RPM
MIN - 1000 RPM to 21 psi (1.5 bar)
1200 RPM above 21 psi (1.5 bar)



STEP 4

- Close all valves and proceed to pressurize the tank and discharge the cargo.



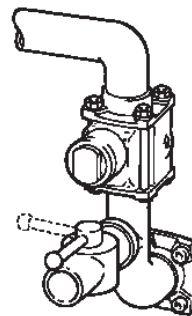
OPERATION

SHUTTING DOWN PROCEDURE - Vehicle Mounted

STEP 1

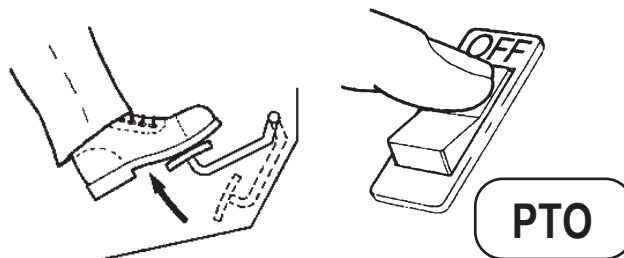
BEFORE shutting down the blower:

- Verify the load has been fully discharged.
- Open all valves to enable the blower, tank and piping to return to atmospheric pressure.



STEP 2

- Depress the clutch and disengage the PTO before bringing the engine speed back to idle.
- Release the clutch.



NOTICE:

DO NOT RUN BLOWER AT LOWER SPEED. BLOWER DOES NOT NEED A COOLING DOWN PERIOD.

CAUTION

DO NOT attempt to restart the discharging in the following instances:

- If the tank is still pressurized.
- If the blower is not running at the correct speed.
- If the blower discharge is not vented to atmosphere.

MAINTENANCE

WARNING



Hazardous machinery can cause severe personal injury or property damage.

FAILURE TO SET VEHICLE EMERGENCY BRAKE AND CHOCK WHEELS BEFORE ATTEMPTING MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING



Hazardous pressure can cause personal injury or death.

FAILURE TO RELEASE ALL SYSTEM AIR, AND WHEN EQUIPPED, MOTOR HYDRAULIC PRESSURE, CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING



Hazardous voltage. Can shock, burn or cause death.

FAILURE TO DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPTING MAINTENANCE CAN CAUSE SHOCK, BURNS OR DEATH.

CAUTION



Extreme heat can cause injury or property damage.

BLOWER, PIPING AND ACCESSORIES WILL BECOME HOT DURING OPERATION AND CAN CAUSE SERIOUS PERSONAL INJURY. ALLOW TO COOL BEFORE HANDLING.

NOTICE:

BLOWER SERVICE AND MAINTENANCE SHALL BE PERFORMED BY QUALIFIED TECHNICIANS ONLY AND SHALL CONFORM TO ALL LOCAL AND NATIONAL CODES, REGULATIONS AND SAFETY STANDARDS.

NOTICE:

FOLLOW ALL HAZARD WARNINGS AND NOTICES PROVIDED IN THE SAFETY DATA SECTION OF THIS MANUAL BEFORE PERFORMING BLOWER SERVICE OR MAINTENANCE.

MAINTENANCE

BUILD TOLERANCES

MODEL	END CLEARANCE	FLOAT	NIP
352	.008 - .010" 200□m - 250□m	.006 - .013" 128□m - 330□m	.008 - .010" 200□m - 250□m
502	.008 - .010" 200□m - 250□m	.015 - .023" 393□m - 600□m	.008 - .010" 200□m - 250□m

MAINTENANCE SCHEDULES

Daily

1. The blower should be run once a day for at least 15 minutes to prevent moisture from collecting inside. This will reduce the risk of corrosion damage to the blower and other equipment in the piping.
2. After washing the vehicle, always run the blower for 15 minutes to remove any water that inadvertently gets into the piping. DO NOT fog or introduce anti-corrosive liquids into the blower to prevent corrosion. Use of liquids in the blower will cause failure.

Weekly

1. Inspect and clean air filter. Inspect DAILY if operating in dirty or severe environment. Check the condition of the inlet filter hose for splits and tears. Replace as necessary.
2. Inspect blower, system piping and components. Repair as necessary.

Monthly

1. When equipped, inspect and grease drive shaft universal joints.
2. Check the relief valve(s) settings and adjust as necessary.
3. Inspect the blower grease seals (13) and (14) and replace as necessary.
4. As conditions require, clean the blower external surfaces and cooling fins. DO NOT allow cleaning fluids to enter the blower inlet.
5. Check wear on relief/check valve, and replace as necessary.

BEARINGS

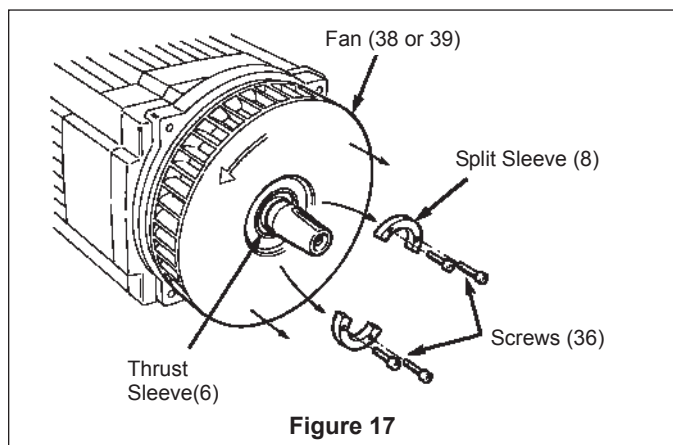
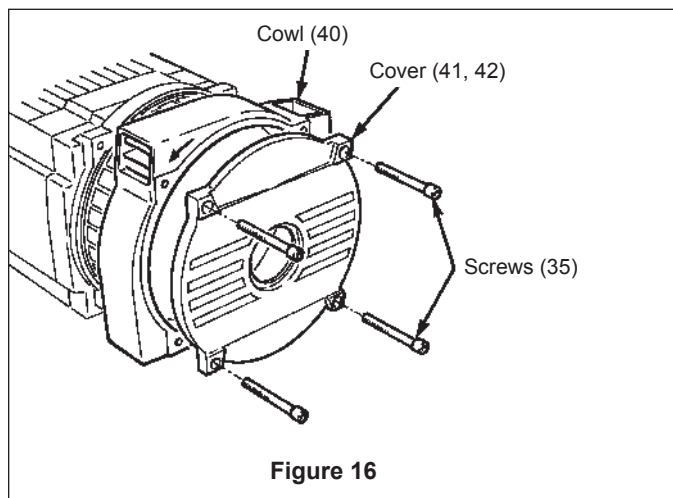
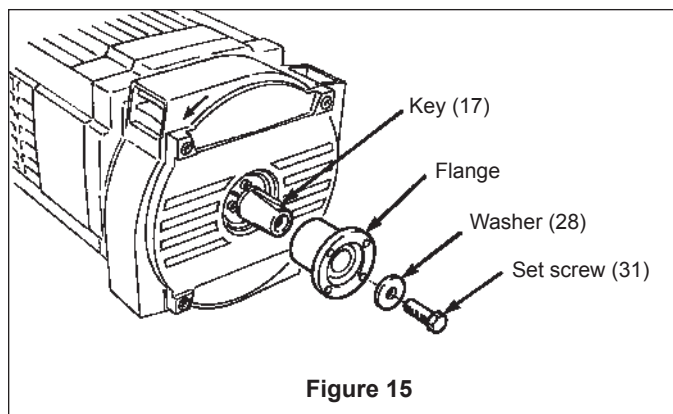
For intermittent operation and vehicle mounted applications, blower bearings MUST be repacked with Aeroshel™ #5 grease, or equivalent, every 500 hours. For all other applications, repack every 1500 hours.

BLADE INSPECTION

For intermittent operation and vehicle mounted applications, inspect the blower blades every 500 hours. For all other applications, inspect every 1500 hours.

Blade inspection and replacement may be performed with blower installed. Blower should be cleaned before proceeding.

1. Thoroughly clean end of machine to be dismantled. Care must be taken during inspection that no dirt, oil or grease enters the machine.
2. If dismantling from drive end, remove set screw (31) and washer (28) from shaft end and remove drive flange from tapered shaft. Remove shaft key (17). See Figure 15.
3. Take out four screws (35), remove cover (41 or 42) (or hydraulic trunk if equipped) and cowl (40). See Figure 16.
4. Loosen four screws (36), remove split sleeve (8), and remove fan (38 or 39) along with thrust sleeve (6). See Figure 17.



MAINTENANCE

- Remove six screws (34) and draw sideplate (2) off dowels and shaft, complete with bearing cap and bearings. See Figure 18. Support the weight of the shaft to help removal. The sideplate may have to be pried away from the body to achieve this. DO NOT damage the machined faces of the the sideplates.
- Once the sideplate is removed, fully support the rotor and shaft with the use of a wood block to keep it from dropping and damaging the bearings. Note and mark which sideplate is removed from clockwise or counterclockwise ends of the blower. (Hint: mark both sideplate and rotor.) See Figure 19.
- The shaft shims (21, 22), roller bearing (11) inner race and distance sleeve (7) may remain on the shaft. These MUST be removed and replaced with the same sideplate assembly. Check that the bearing grease is not contaminated with dirt. Replace grease as necessary. If equipped with a body shim (23, 24), use care when removing. Note and mark shim position. If shim becomes damaged it must be replaced with an identical size. (The total shim size may be stamped on both ends of the body.) Install this size shim to one end only. See Figure 19.

NOTICE:

IF EQUIPPED WITH BODY SHIMS, NOTE THEIR SIZE AND LOCATION. SHIMS MUST BE REINSTALLED IN ORIGINAL POSITIONS.

NOTICE:

KEEP SHAFT END BEARING ASSEMBLIES SEPARATE, AS BEARING ASSEMBLIES MUST BE REPLACED ON THE SAME SHAFT ENDS FROM WHICH THEY WERE REMOVED.

- Remove blades (5) for inspection. Blades must be replaced if chipped or if the width of the blade has worn below 2.51" (64mm). Under no circumstances must the blades be used under 2.28" (58mm). See Figure 20. When replacing blades, make sure they are inserted into the rotor slots in the correct position as shown in Figure 21. The angle of the blade tip must match the arrows on the body bore.

NOTICE:

HANDLE BLADES BY EDGES ONLY.

NOTICE:

BLADE BREAKAGE REQUIRES THAT AIR FILTER BE CLEANED OR REPLACED, SUCTION AND DISCHARGE PIPING BE CLEANED, AND RELIEF/CHECK VALVES INSPECTED OR REPLACED.

- Reassemble in reverse order to dismantling - refer to "Blower Assembly" steps 9 through 17. All internal surfaces of body, rotor, blades and sideplates must be free of oil or grease. When reassembling, replace all O-rings that have been removed during service with new.
- Use extreme care not to damage wiper seal (12) if sideplate is to be fitted over existing sleeve (7), shaft shims (21, 22) and roller bearing (11) inner race. Be sure that the O-rings are fully in the recess and are not pinched on assembly.

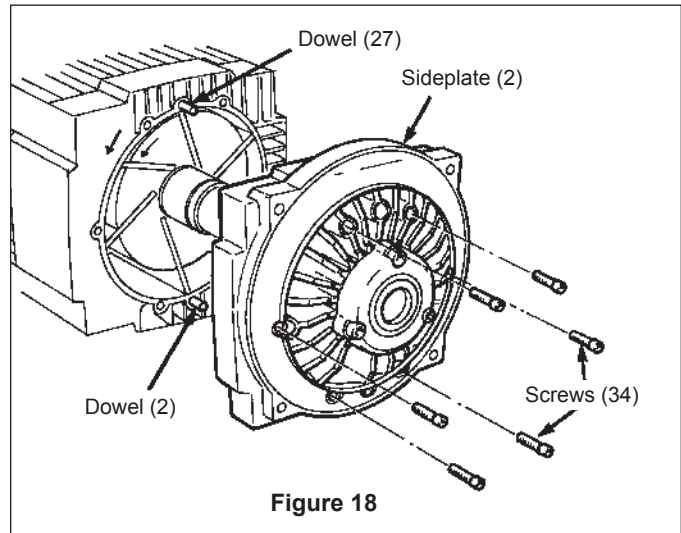


Figure 18

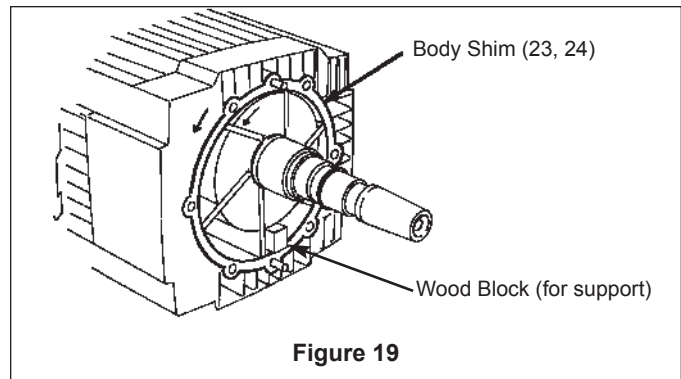


Figure 19

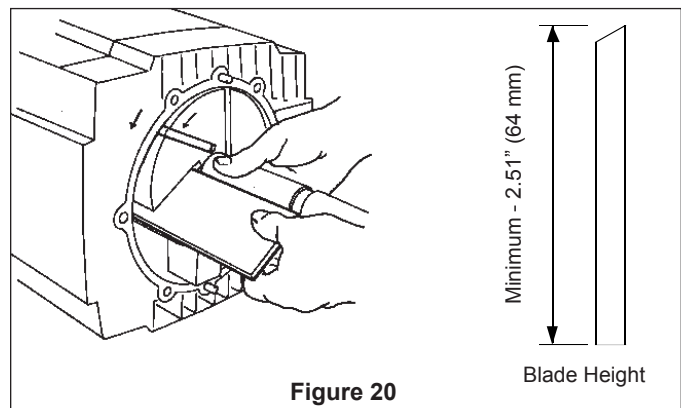


Figure 20

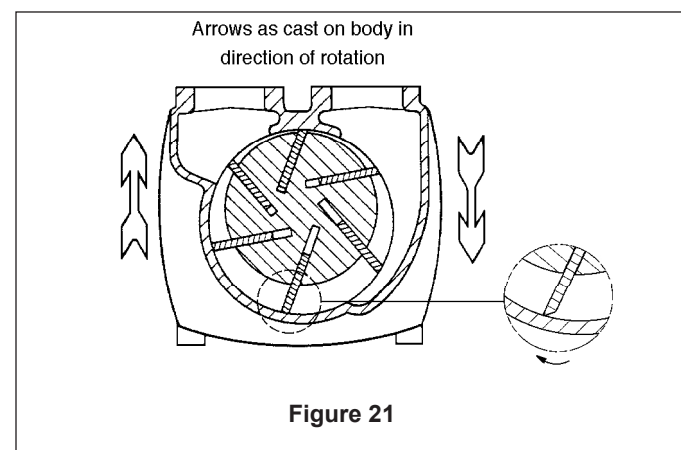


Figure 21

MAINTENANCE

BLOWER DISASSEMBLY

NOTICE:

FOLLOW ALL HAZARD WARNINGS AND NOTICES PROVIDED IN THE "SAFETY DATA" AND "MAINTENANCE" SECTIONS OF THIS MANUAL.

1. Disconnect the blower from the drive shaft, and remove the blower from vehicle. After a thorough external cleaning, place the blower, feet down, on a workbench.
2. To disassemble the blower, follow steps 2 through 8 of the "Blade Inspection" section of this manual.

IMPORTANT NOTE: Once the cover and fan is removed ("Blade Inspection" steps 2 through 4) the blower should be turned upside-down (mounting feet up) before continuing with steps 5 through 8. The blower can be supported on a pair of false feet (see Parts List) or rested on packing placed on either side of the flanges so that the sideplates are clear of the bench and the machine is well supported. See Figure 22.

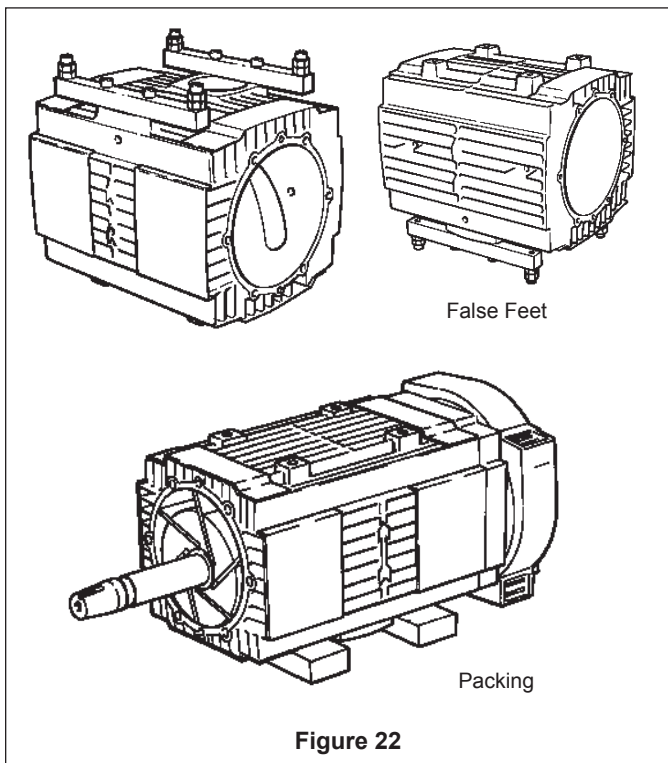


Figure 22

3. After removing the blades (step 8), carefully pull the rotor out, supporting it from underneath. Use lifting equipment to facilitate removal. The shaft is tapped for M12 eyebolt to assist with removal.

NOTICE:

ROTOR IS HEAVY. LIFTING EQUIPMENT IS RECOMMENDED WHEN REMOVING ROTOR.

SIDEPLATE OVERHAUL

Sideplate assemblies normally need no maintenance except for regreasing every 500 hours for intermittent/vehicle applications or every 1000 hours for continuous/industrial applications. If damage or wear has occurred use the following procedure for servicing (See Figure 23).

NOTE: The following equipment will be necessary:

- Circlip pliers - 2" (50mm) maximum opening
- Seal Punch for wiper seals
- Seal Punch for oil seals
- 2 sets of Feeler Gauges

1. Remove fan sleeve (9) and distance sleeve (7) from each end of sideplate assembly, noting their position.
2. Take out three screws (37) securing bearing cap (3) and remove together with thrust bearing (10) and bearing cap O-ring (16). Ensure the two spacer shims (22) remain with thrust bearing (10).
3. Remove roller bearing (11). Bearing is slip fit.
4. Tap out seals from bearing caps and sideplates using a drift. **Remove circlip (29) before removing wiper seal (12).**

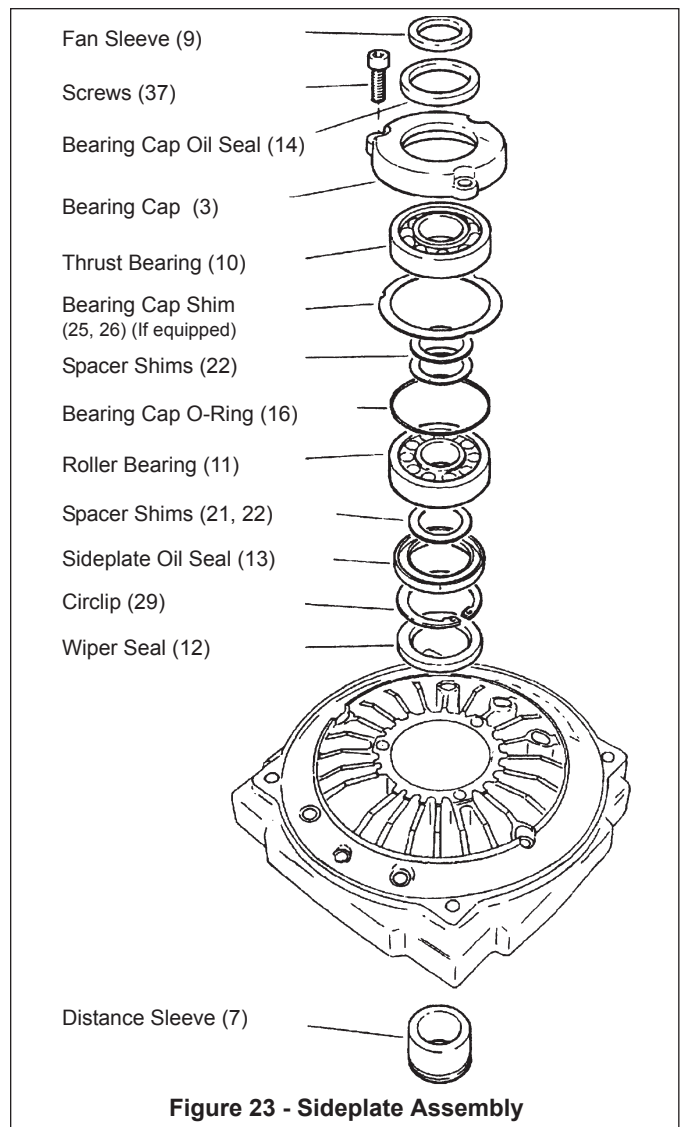


Figure 23 - Sideplate Assembly

MAINTENANCE

- Thoroughly clean sideplate and bearings. If either sideplate or bearings show any damage or wear, they must be replaced or serviced. Slight damage or scoring to the sideplate may be carefully filed off.
- Lay sideplate face down on a firm, flat clean surface. The surface must be smaller than the sideplate, and not touch the rim. Using a properly sized seal punch, tap in a new wiper seal (12) to the full depth of the recess with the **lip down**, facing the rotor, for **Pressure Use**. See Figure 24.

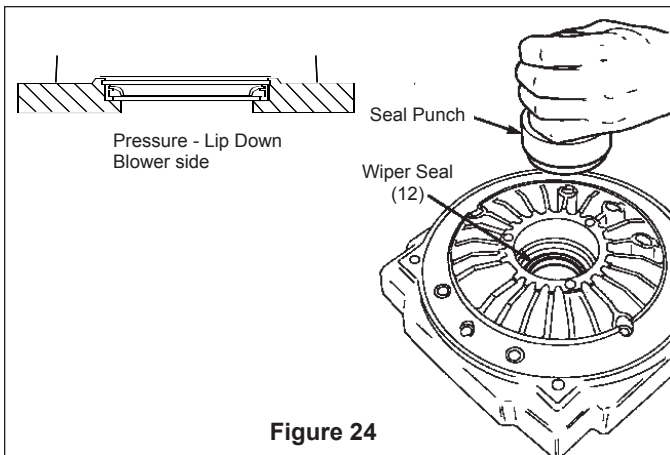


Figure 24

- Using circlip pliers, install circlip (29) into sideplate. See Figure 25.
- Lightly grease a new sideplate oil seal (13). Using a seal punch, insert into bearing recess with the lip up, facing the bearing. Ensure the oil seal is flush with bottom of bearing recess. See Figure 26.
- From the rotor side, push in distance sleeve (7), chamfered end first, through both seals. Be sure distance seal is flush to the rotor face. If a new seal is fitted, it may be necessary to slightly stretch the seal with a smooth round piece of steel, to allow the sleeve to enter without damaging the seal or pushing it backwards.
- Repack bearing and bearing side of oil seal with Aeroshel™ #5 grease. Push bearing into sideplate with the writing on the outer race on top, and the inner shoulder of bearing facing the rotor. See Figure 27.
- Lightly grease new bearing cap oil seal (14) and install into bearing cap with lip up, so that it will face the bearing. See Figure 28.
- Pack bearing with Aeroshel™ #5 grease and insert into bearing cap with the **thrust side** first (facing fan). The bearing should be a loose fit. See Figure 29.

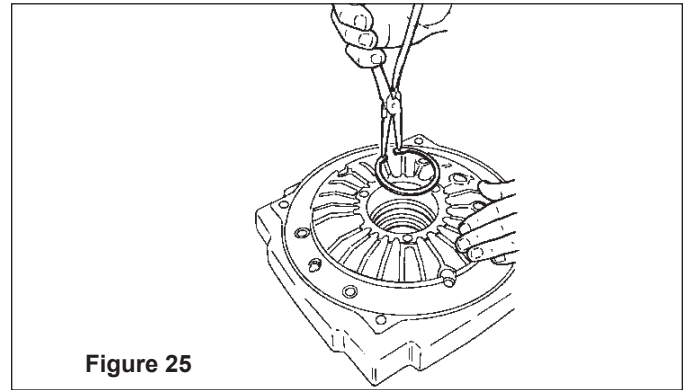


Figure 25

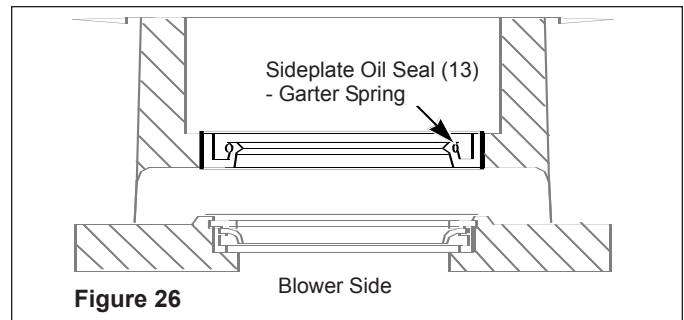


Figure 26

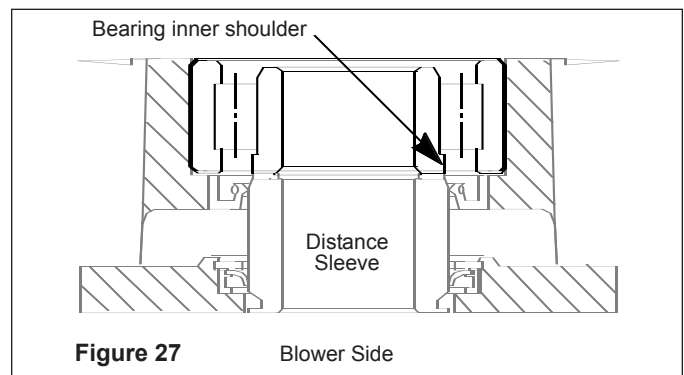


Figure 27

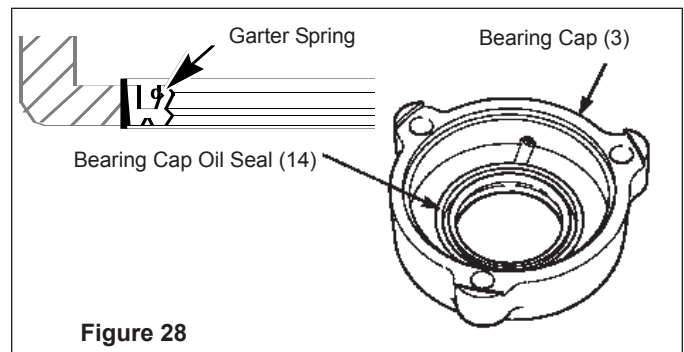


Figure 28

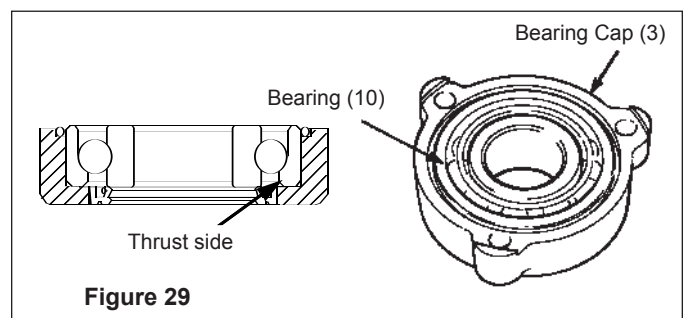
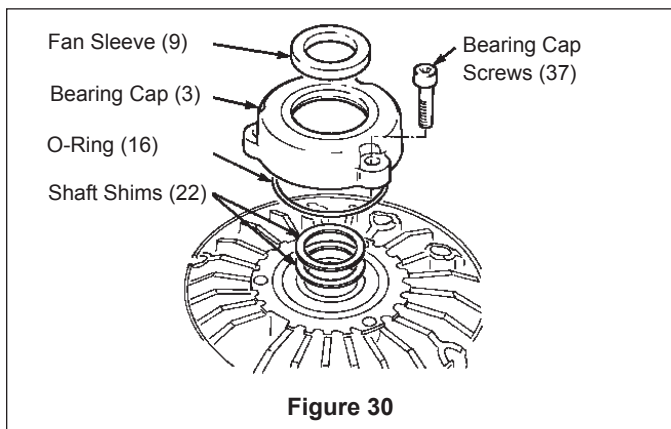


Figure 29

MAINTENANCE

13. Install the two 0.005" (0.125 mm) shims (22) between the two bearings. Install a new bearing cap O-ring (16) and attach the bearing cap to the sideplate. Install the three bearing cap screws (37) and tighten to 26 lbs ft (35 Nm). See Figure 30.

14. Push fan sleeve (9) into seal (14). See Figure 30.



15. Prior to attaching sideplate to blower body, check the end-clearance between the rotor and sideplate using two feeler gauge strips. The rotor must be fully seated in the sideplate and the lifting hook (if equipped) removed. See Figure 31.

NOTICE:

BE SURE TO MATCH THE CORRECT SIDEPLATE WITH THE CORRECT END OF THE ROTOR.

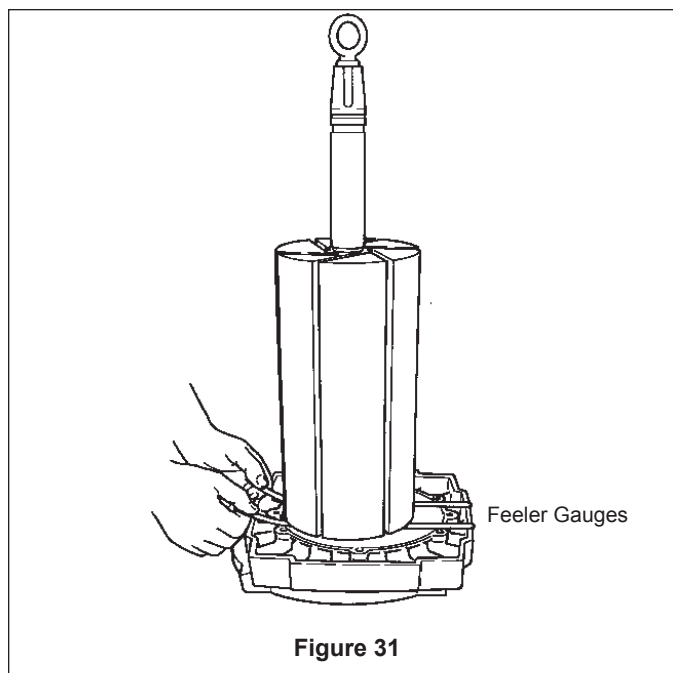
The clearances can be checked with or without the split sleeves tightened. The most accurate method is with the fan on and the split sleeves tightened. The clearances should be as follows:

- a. With the **fan loose** and split sleeves NOT tightened:
Clearance = 0.008" to 0.010" (0.200 mm to 0.250 mm)
- b. With the **fan on** and split sleeves TIGHTENED to torque of 15 lbs ft (20 Nm):
Clearance = 0.004" to 0.007" (0.100 mm to 0.175 mm)

To increase the clearance, add shaft shims (21, 22) between the bearing (11) and sleeve (7). To reduce the clearance, first remove the shaft shims (21, 22), and then, if clearance is still too large, fit bearing cap shims (25, 26) between the sideplate and the bearing cap.

NOTICE:

ROTOR IS HEAVY. LIFTING EQUIPMENT IS RECOMMENDED WHEN HANDLING ROTOR.



BLOWER ASSEMBLY

Torque Settings

PART REF. NO.	TORQUE VALUE
36	15 lbs ft (20 Nm)
30, 31, 34 & 37	26 lbs ft (35 Nm)
35	18 lbs ft (25 Nm)

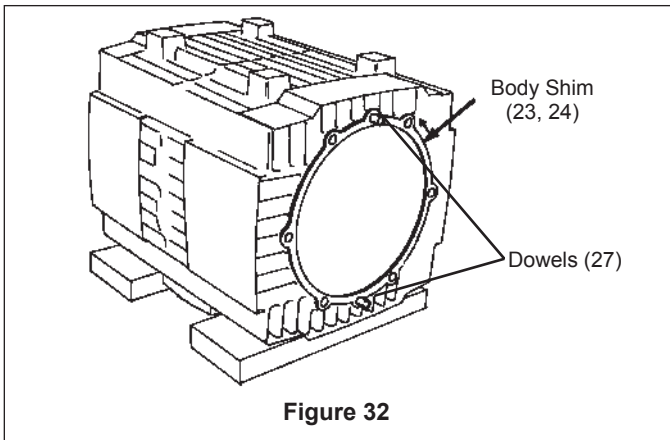
Before reassembling blower, check all parts for damage. Excessively worn parts must be replaced. Light scoring in the body may be removed by honing or with fine emery paper. If body shims are fitted (a size may be stamped on each end of the body to indicate this) ensure that they are replaced in their original position.

1. Stand body, flanges down, on packing at least 1 inch (25mm) thick. Alternatively, use false feet and fix these to the flange ports as shown in Figure 22. Then turn body over.
2. Tap dowels (27) into the body at both ends. **It is important that the dowels are not left in the sideplate.** See Figure 32, page 13.
3. If required, install body shims (23, 24). Body shims will not be necessary unless already present when machine was dismantled. The total shim size may be stamped on both ends of the body. Install this size shim to one end ONLY. See Figure 32, page 14.

NOTICE:

IF THE ORIGINAL SHIMS ARE NOT AVAILABLE, OR IF THE BODY OR ROTOR HAVE BEEN REPLACED, A NEW ROTOR CLEARANCE MUST BE CALCULATED.

MAINTENANCE



- If a new body or rotor is required or the shim size is lost, the rotor end float clearance must be calculated. Measure the parts and use the following formula:

Required Rotor Clearance = (body length + any body shims) - (rotor length + both end clearances). The "Build Tolerances" table on page 9 of this manual provides the required clearance tolerances. Add or delete body shims to achieve required clearance.

- Check the rotor slots for wear, damage or burrs. The blades must slide freely in every direction in the slots. Damage or nicks to the slots must be filed off. Use care not to damage the plating when filing.
- With a new sideplate O-ring installed (15), attach one sideplate assembly. All internal surfaces of body, rotor, blades and sideplates must be free of oil or grease. Be sure the sideplate is matched to the rotor end where the clearances were set. See Figure 33.
- Slide the rotor carefully into the body with the slots leaning towards direction of rotation. Match arrows on rotor with arrows cast on body. If resting the rotor shaft on the bore, make sure the keyway faces up to avoid scratching surface. See Figure 34. Once the rotor is fully into the bore, slide the shaft through the sideplate. Support the rotor with a wooden block to prevent bearing damage.

NOTICE:

ROTOR IS HEAVY. LIFTING EQUIPMENT IS RECOMMENDED WHEN HANDLING ROTOR.

- With blades and hands free from oil or grease, slide blades into rotor slots, ensuring that the angle at the blade tip matches the arrows on body bore. See Figure 35.

NOTICE:

HANDLE BLADES BY EDGES.

- To prevent any possible corrosion, and to aid future dismantling, apply a copper-based anti-seize compound or a quality high temperature grease into the bores of the bearings and sleeves.
- Install a new sideplate O-ring (15) into the groove. Ensure the O-ring does not become pinched when attaching sideplate to body. See Figure 36.

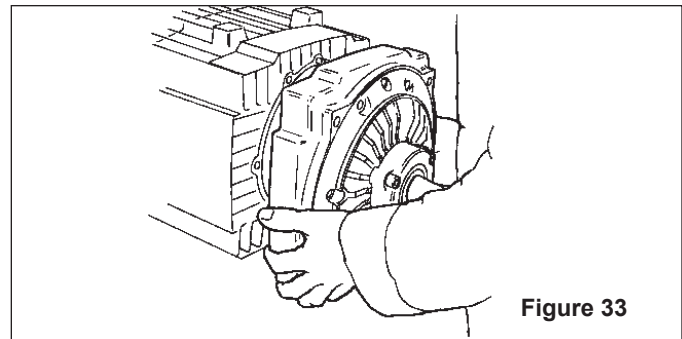


Figure 33

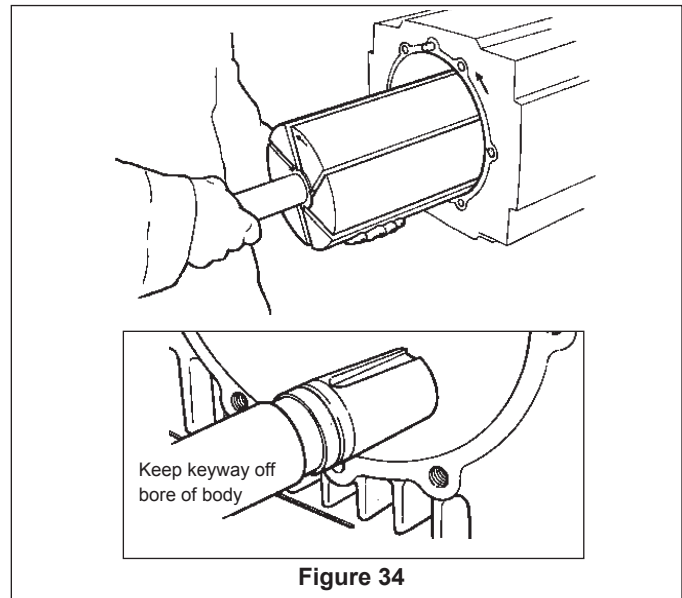


Figure 34

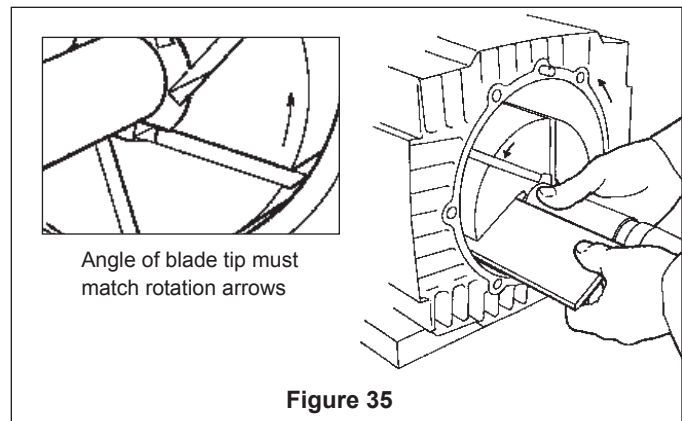


Figure 35

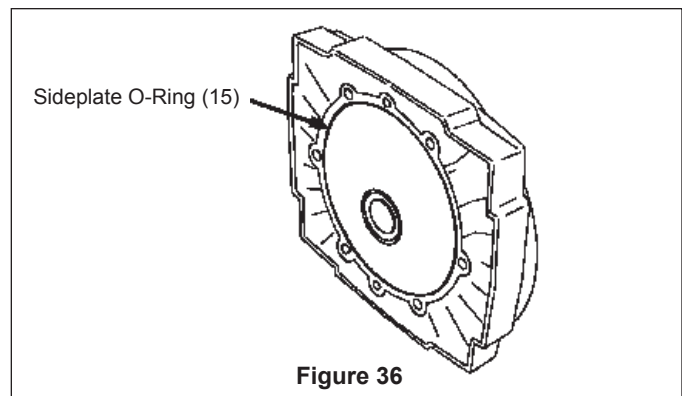


Figure 36

MAINTENANCE

11. Slide the sideplate assembly over the shaft. Remove wooden block and slide sideplate assembly against the body. Be sure to support the rotor when installing the sideplate assembly. Install and tighten the six screws (34) to a torque of 26 lbs ft (35 Nm). See Figure 37.
12. If necessary, add additional Aeroshel™ #5 grease through the grease nipple on the bearing cap. **DO NOT** use a pneumatic grease gun or over fill.
13. Slide both thrust sleeves, flat face toward rotor, over the shaft and into the bearing caps.
14. Install both fans (36).
15. Carefully inspect the split shoulders for any damage or wear and ensure recess edges are sharp. Replace if necessary. See Figure 38.
16. When reinstalling the split sleeve, check that it is fully seated in the recess and that the screws are located fully in the thrust sleeve. If there is excessive wear on the shaft recess, it should be redressed so that the edge is sharp. See Figures 38 and 39.

When installing the split sleeves, note the following:

- a. It may be necessary to use longer split sleeve cap screws.
 - b. It is important the split sleeve screws (36) be tightened to the specified torque of 15 lbs ft (20 Nm) using a calibrated torque wrench.
 - c. Check both ends even if only one end has been loosened. Failure to check both ends will result in incorrect sideplate clearances and loose fans, leading to potential failure of the blower.
17. Replace cowls (40) so that the arrows are on top and facing the direction of rotation. Replace the cover (41, 42). Install and tighten the screws (35) to 18 lbs ft (25 Nm). See Figure 40.

NOTICE:

ARROWS ON THE COWL, BODY AND FAN MUST FACE IN THE SAME DIRECTION OF ROTATION AS THE ROTOR.

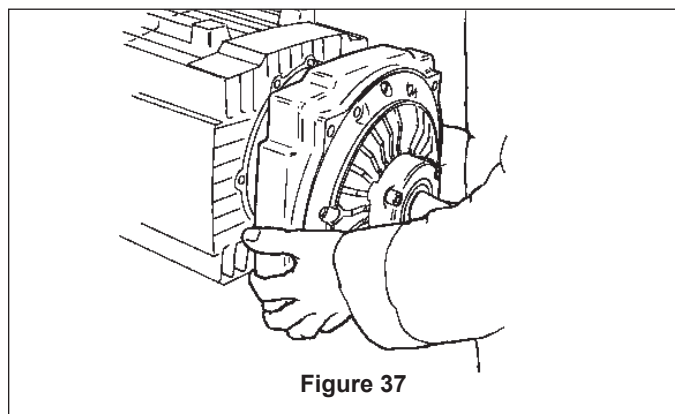


Figure 37

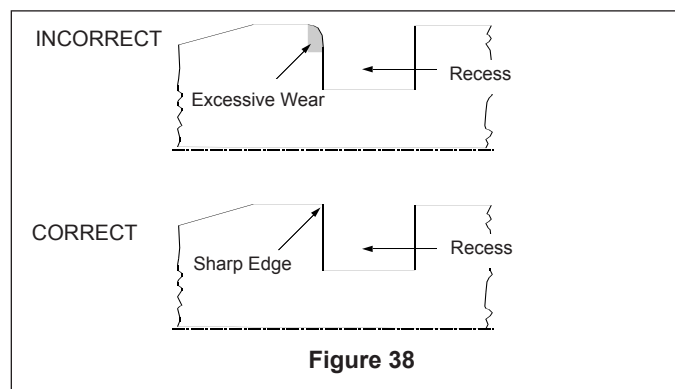


Figure 38

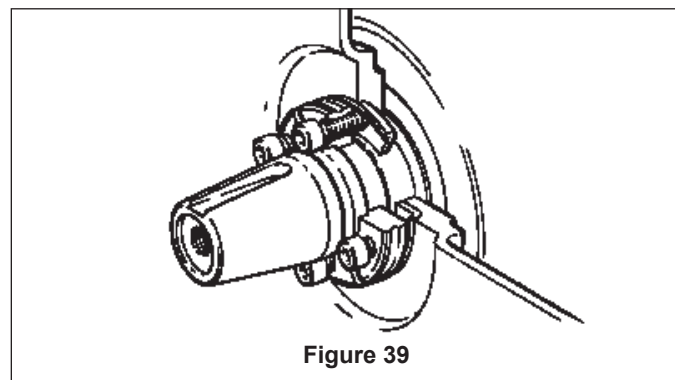


Figure 39

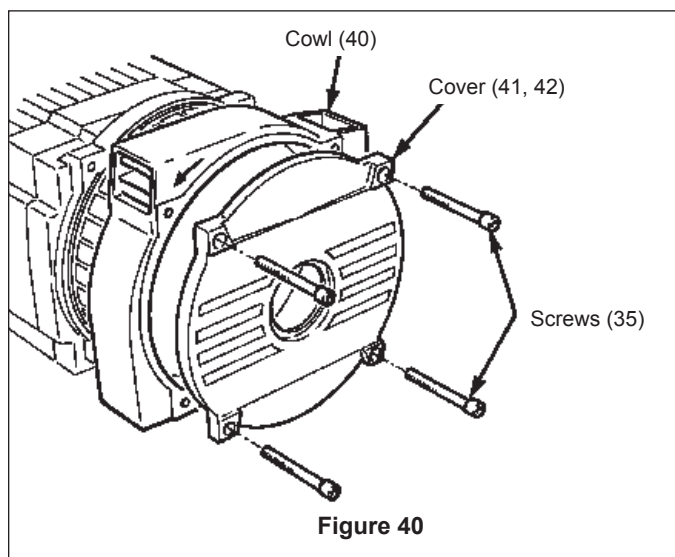


Figure 40

TROUBLESHOOTING

NOTICE:

FOLLOW ALL HAZARD WARNINGS AND NOTICES IN THE SAFETY
DATA AND MAINTENANCE SECTIONS OF THIS MANUAL.

PROBLEM	CAUSE
Blades Sticking See causes 1 through 3	1. Debris or contamination in blower.
Broken or Chipped Blades See causes 1, 4, 5, 7, 8, 14, 15	2. Rotor slot damage.
Excessive Noise See causes 3, 6, 7, 10 & 11	3. Worn or damaged blades.
Overheating See causes 1, 2, 3, 8 through 13	4. Incorrect operating speed.
	5. Incorrect rotation.
	6. Ridged bore in blower body.
	7. Operating speed too slow.
	8. Operating speed too fast.
	9. Cooling fins/outlets clogged.
	10. Driver misalignment.
	11. Incorrect fan operation.
	12. Air filter plugged.
	13. Fan cowls incorrectly fitted.
	14. Filter hose damaged.
	15. Debris or contamination in inlet piping and /or filter.

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