WALINGA® INC.

Blower Repair & Maintenance Manual

MODELS: 816 & 1020

TO OUR VALUED CUSTOMERS:

Thank you for choosing WALINGA.

It is the purpose of this manual to help you properly install, maintain and service your WALINGA blower; follow the instructions carefully and you will be rewarded with long-life service.

For your convenience, should you require any information related to Parts, Service, Technical Engineering, or access to the Walinga network of authorized dealers or service providers, please contact one of the following Walinga locations:

CORPORATE HEAD OFFICE:
5656 Highway 6N
RR#5, Guelph, Ontario, N1H 6J2
PHONE: (888) 925-4642 FAX: (519) 824-5651
www.walinga.com

FACTORY DISTRIBUTION AND SERVICE CENTRES:
70 3rd Ave. N.E. Box 1790 Carman, Manitoba Canada R0G 0J0
Tel: (204) 745-2951 Fax: (204) 745-6309

938 Glengarry Cres. Fergus, Ontario Canada N1M 2W7
Tel: (519) 787-8227 Fax: (519) 787-8210

1190 Electric Ave. Wayland , MI.USA 49348
Tel: (800) 466-1197 Fax: (616) 877-3474

24 Molloy St, Toowoomba, Queensland Australia 4350
Tel: 07-4634-7344 Email: mail@customvac.com.au

Blower Repair & Maintenance Manual
for 816 & 1020 Blowers

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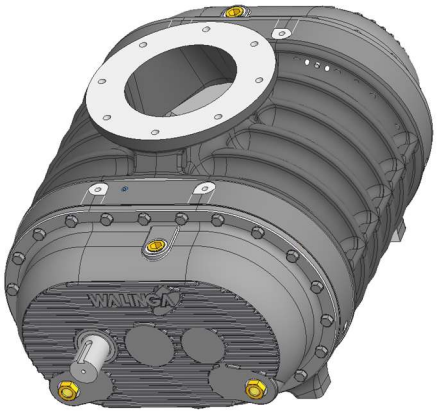
NOTES

MODEL OVERVIEW

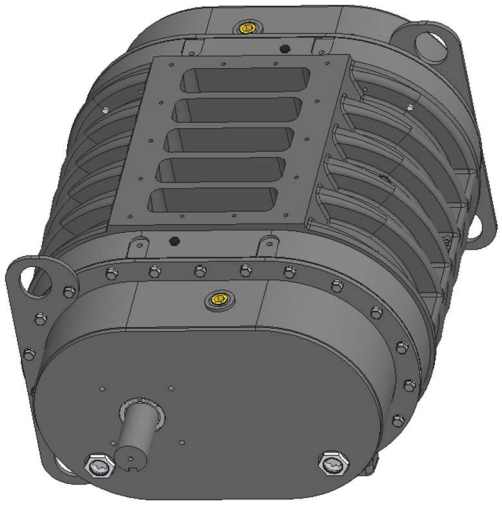
This manual is written to cover the Walinga 816 and 1020 model blowers.

These high performance blowers offer 1300 to 2750 CFM at pressures up to 15 psi continuously.

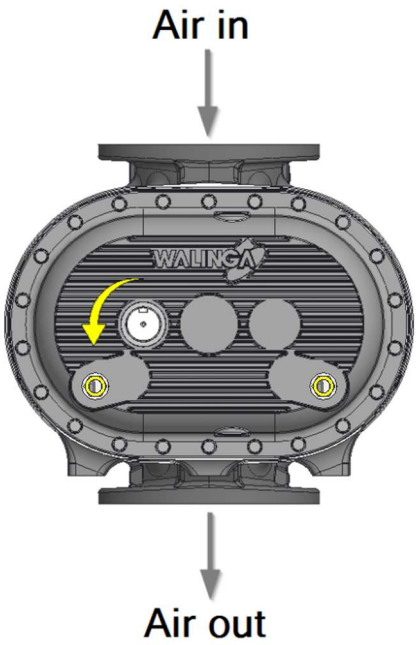
The shaft position on Walinga Hard Coated 816/1020 Blowers is at the left-hand side when viewed from the drive end.



816 Blower



1020 Blower



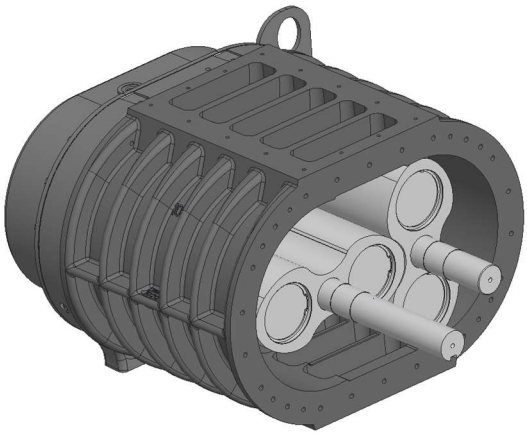
SPECIAL FEATURES OF WALINGA BLOWERS

WALINGA HARD COATED BLOWERS

Walinga Blowers feature in-house internal hard coated components to increase blower life. Walinga blowers are fabricated from alloy castings that facilitate hardening. The process reduces premature wear from abrasive dust ensuring a longer life than unhardened blowers.

OPERATION

Refer to Figure 1. Rotary positive displacement design incorporates the use of two figure eight impellers which rotate in opposite directions to deliver a metered volume of air. The impellers are separated by minute clearances which are designed into the unit. These clearances are maintained by timing gears.

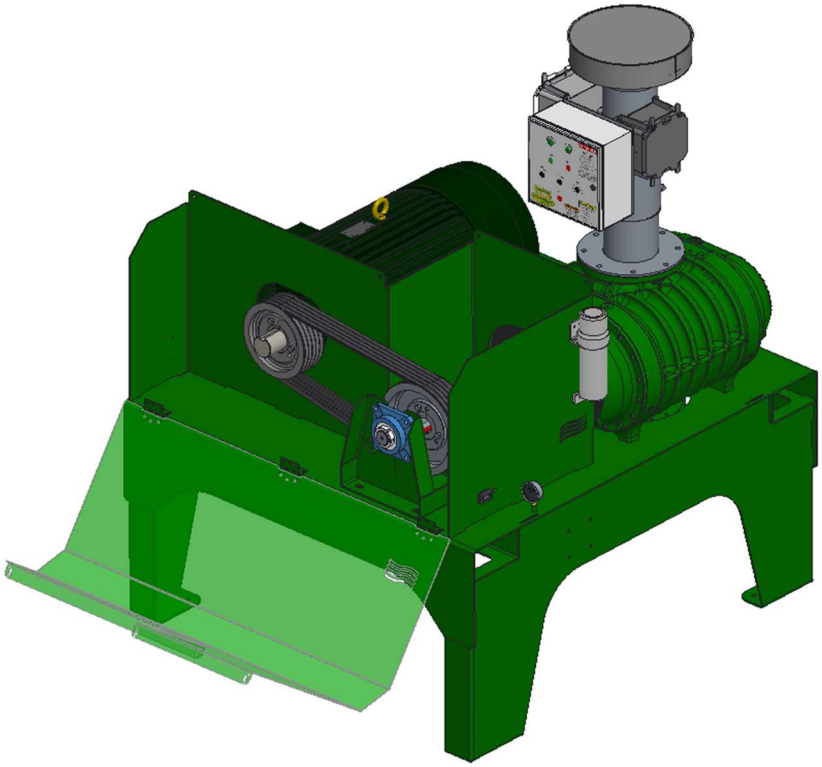


CONSTRUCTION

Walinga blowers are ruggedly built for long life. Impellers are dynamically balanced to operate without vibration. Large alloy steel shafts are ground and polished. Bearings are heavy duty anti-friction type which enable the blower to maintain its original factory clearances. Bearings are protected from dirt and contamination by oil seals. Precision, steel, helical gears are oil lubricated by a completely self-contained splash system which atomizes the oil. Breathers are provided to prevent the air from being contaminated by the blower lubricant.

TYPES OF DRIVE

Walinga 816/1020 blowers are typically **V-belt driven** to permit changes of speed to accommodate variations in operation requirements.



SECTION ONE - Preventative Maintenance

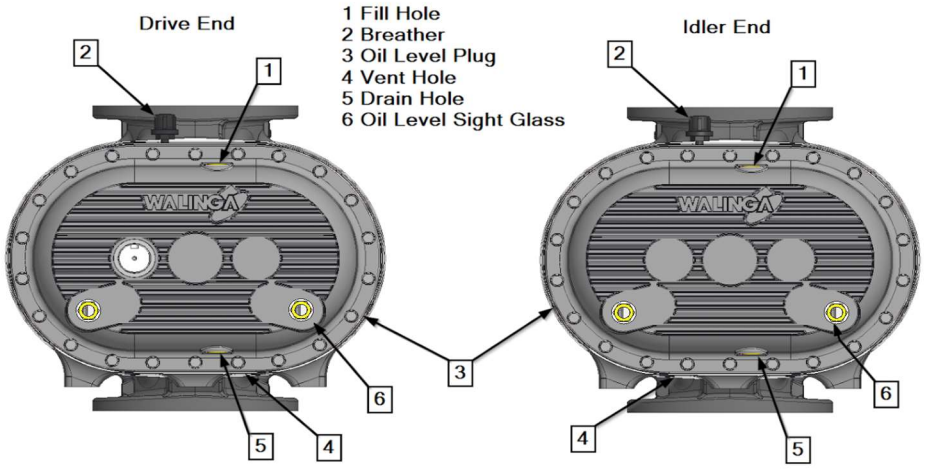
LUBRICATION
Anti-friction bearings and precision, steel helical gears are oil lubricated by a completely self-contained splash system which atomizes the oil. No external oil feed systems or coolers are required.

Units are shipped with oil in the gear case or bearing housing. Do not operate before checking lubrication. The vent and oil level plug arrangement are shown in figure 8. Remove the oil fill plug from the fill hole at the top of the cover and the plug from the oil level hole located at the side of the headplate. Fill the housings until oil drips out of the oil level hole. Do not overfill. * Replace both plugs. **Use Walinga Super Duty Blower Oil (Walinga Part# 98-13813-5).** In most cases, the operating temperature of the blower will be in the 100-250 degree Fahrenheit range.

Walinga recommends the following oil change interval:

- First 100 hours: Remove the break-in oil for all applications.
- Every 100 hours after break-in oil change: For blowers installed on Agri-Vac, Ultra-Vac, and Chem-Veyor units.
- Every 400 hours: For blowers installed on Ultra-Veyors units without filtered inlet & filtered breathers (typical farm application).
- Every 1250 hours: For blowers installed on Ultra-Veyors with filtered inlet & filtered breathers (typical commercial application).

The oil level should be checked daily. Please note that if an inspection indicates it is necessary, the oil change should be completed at shorter intervals.



* On units equipped with sight glass, check to be sure that oil levels registers a quarter of the sight glass.

Table 1 - OIL CAPACITY LITERS (US QUARTS)

BLOWER MODEL #	FRONT	REAR
816	3.6 (3.8)	4.5 (4.76)
1020	8.3 (8.77)	9.4 (9.93)

SPECIAL NOTE: As a result of blower operating temperatures, condensation can occur and result in water formation in the lubricating oil reservoir. It is important that any water accumulation be eliminated, in order to ensure proper lubrication and long life.

Allow the blower to cool down before driving away to prevent condensation and freeze up in cold weather.

CARE AND CLEANING

RELIEF VALVES
Check the function of relief valves. Improperly functioning relief valves can cause the system to run at a higher vacuum or pressure levels. This can lead to the blower operating at elevated temperatures, which can cause significant damage and failure. Refer to the system owner's manual for proper relief valve setting.

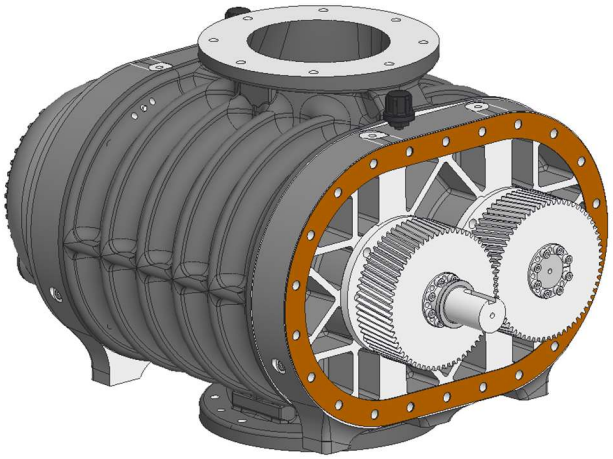
VENT HOLES
Vent holes should be checked and cleaned on a regular basis. Plugged vent holes can cause pressure to build up around the shaft seals, causing dust and debris to enter the oil cavity, significantly reducing the life of the blower.

HOUSEKEEPING
Blowers should be kept clean from dust accumulation. Dust and debris can build up on the surfaces of the blower. When the blower is in operation, these surfaces can become very, potentially causing the dust to smolder or burn.

SECTION TWO - Clearances

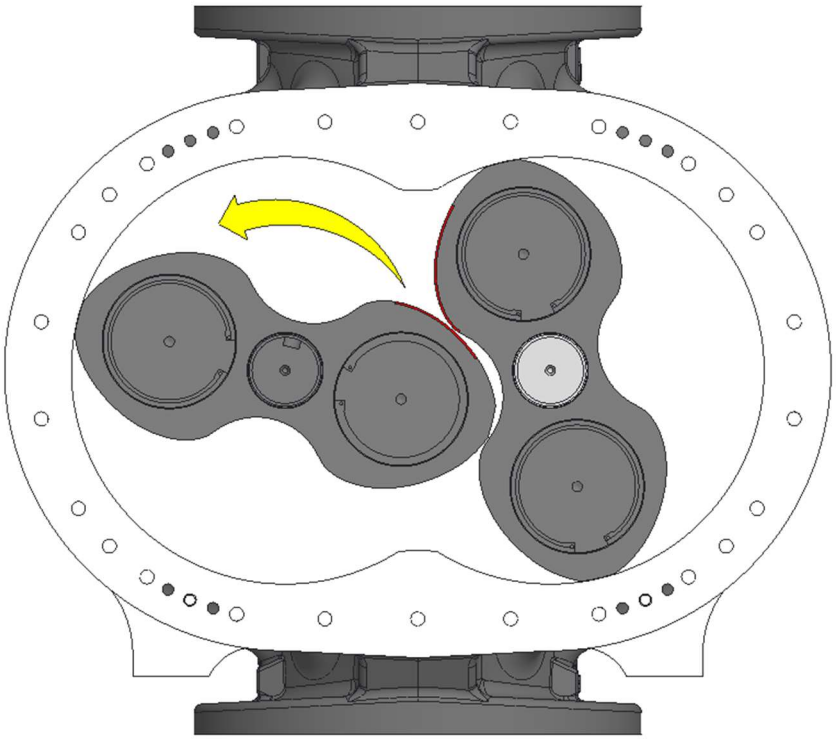
RETIMING

Aside from lubrication covered above, one of the most important maintenance procedures which may arise and needs explanation in the manual is the retiming of WALINGA blowers. Originally, the impellers are separated by pre-determined minute clearances which are designed into the unit. These clearances are maintained by the timing gears. Any malfunction which disrupts this clearance must be corrected and the unit must be retimed.
Retiming is necessary to reset impeller clearance after a blower has been jammed and the removal of the foreign material does not stop the knocking or pounding during operation.



DETERMINING PROPER IMPELLER CLEARANCE

The timing of a blower is the setting of one impeller with respect to the other so they do not touch during operation. The timing clearances are determined by pulling a feeler gauge (precision shim) through the whole timing area between the two impellers. The Leading edge is the leading side of the lobe when the impellers rotate. The trailing edge is the opposite side. *The picture below highlights the timing area of the leading edge.*
Note that the impellers are shown viewed from the drive end of the blower; always face the drive shaft end when determining clearance.



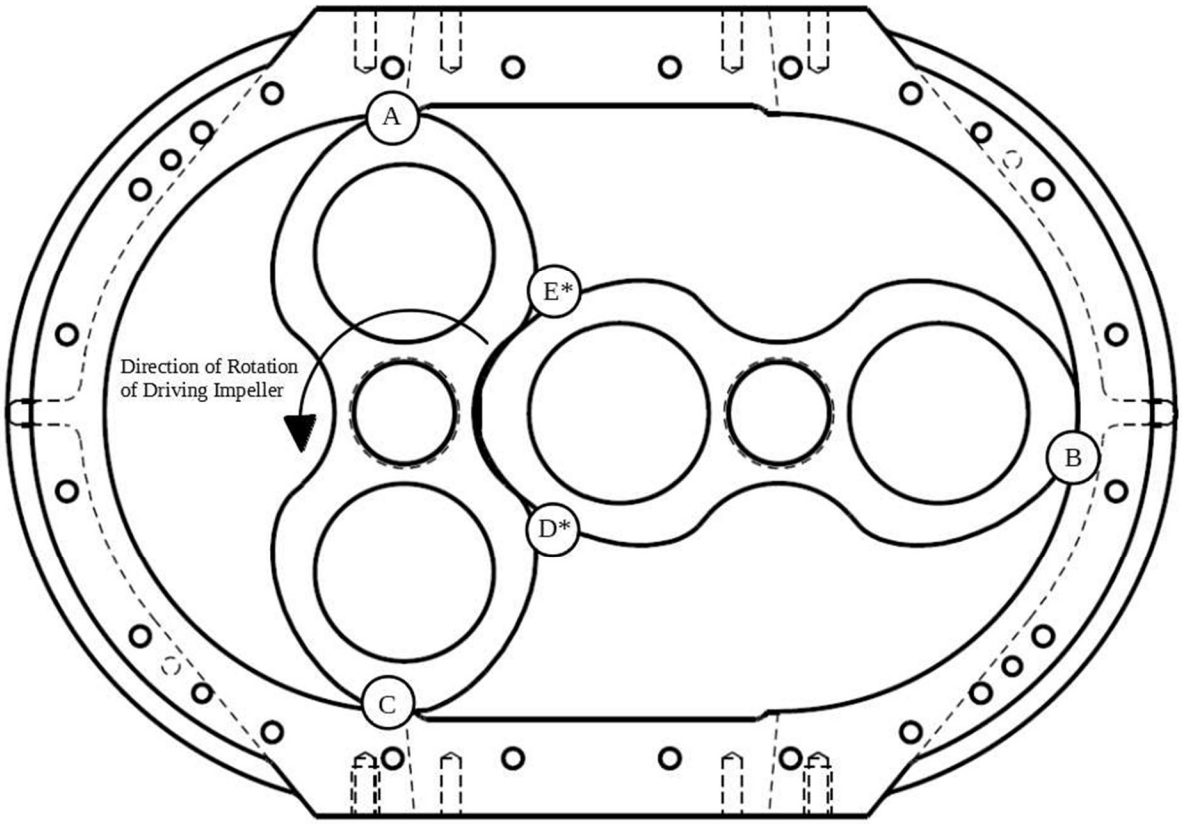
Attention: The timing and tip clearances are very important. Maintaining proper clearances will prevent damage to the impellers and will ensure maximum performance.

Table 2 - 816 BLOWER SPECIFICATION CHART

	Minimum	Maximum	Denoted Below
Tip Clearance - Top	.016	.019	A
Tip Clearance - Middle	.013	.017	B
Tip Clearance - Bottom	.009	.011	C
Advanced Timing Clearance			
Leading Edge	.020	.022	D
Trailing Edge	.012	.016	E
Total End Clearance	N/A	.034	
Drive End Clearance	.016	.022	F
Idler End Clearance	.009	.012	G

Table 3 - 1020 BLOWER SPECIFICATION CHART

	Minimum	Maximum	Denoted Below
Tip Clearance - Top	.021	.025	A
Tip Clearance - Middle	.015	.020	B
Tip Clearance - Bottom	.010	.014	C
Advanced Timing Clearance			
Leading Edge	.025	.028	D
Trailing Edge	.016	.021	E
Total End Clearance	N/A	.036	
Drive End Clearance	.020	N/A	F
Idler End Clearance	.010	N/A	G



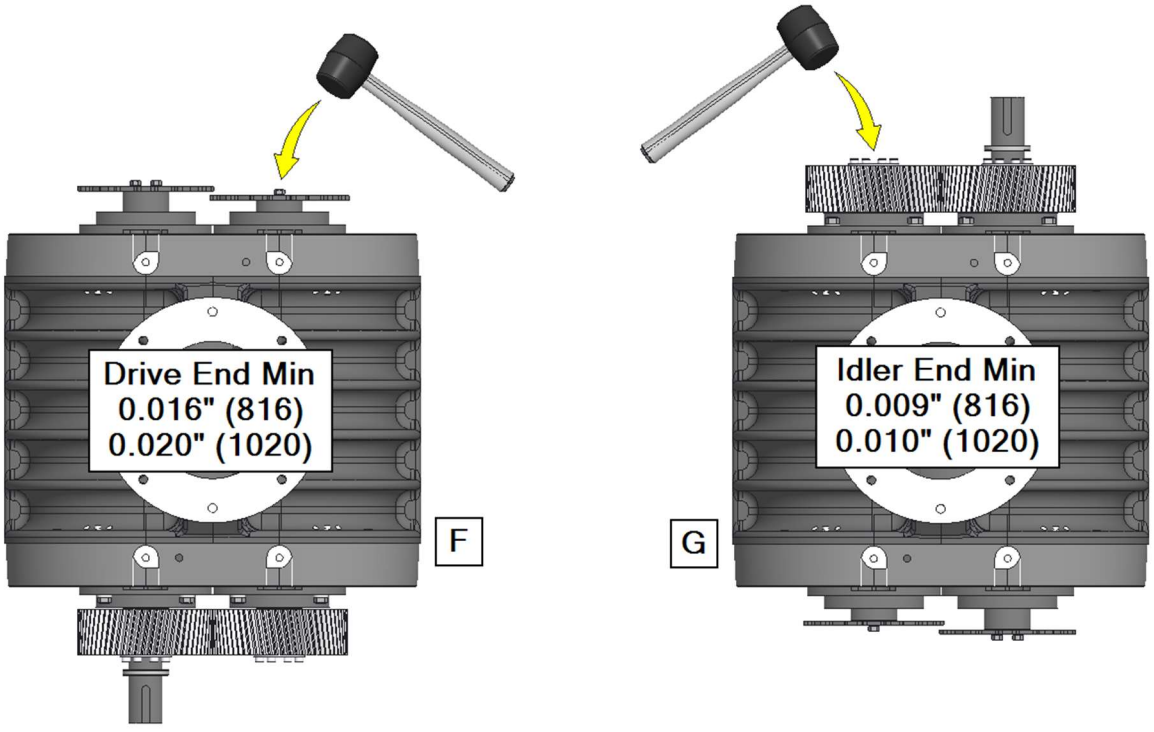
CHECKING AND RESETTING TIP CLEARANCE

1. Check tip clearance by sliding a feeler gauge between impeller and housing. Rotate impellers in casing for checking clearances at the top, middle and bottom. See clearance specs in table above.
2. The minimum spec should be taken at the tightest point.
3. If proper clearance cannot be achieved remove the dowel pins and re-set timing as described below.
4. Loosen the four socket cap screws, 1/2-13 x 2-3/4" in countersunk holes and tighten them again with a tool until snug.
5. Adjust the head plates by tapping them from side to side and up and down until proper clearances are achieved.
6. Tighten the four cap screws in each headplate and check clearances again, if they are satisfactory, drill and ream new holes for the 3/8" dowel pins.
7. Install dowel pins and re-check tip clearances, these pins are press fitted.

CHECKING AND RESETTING END CLEARANCE

The following picture illustrates how to check the minimum end clearances at the drive and gear end of the blower.

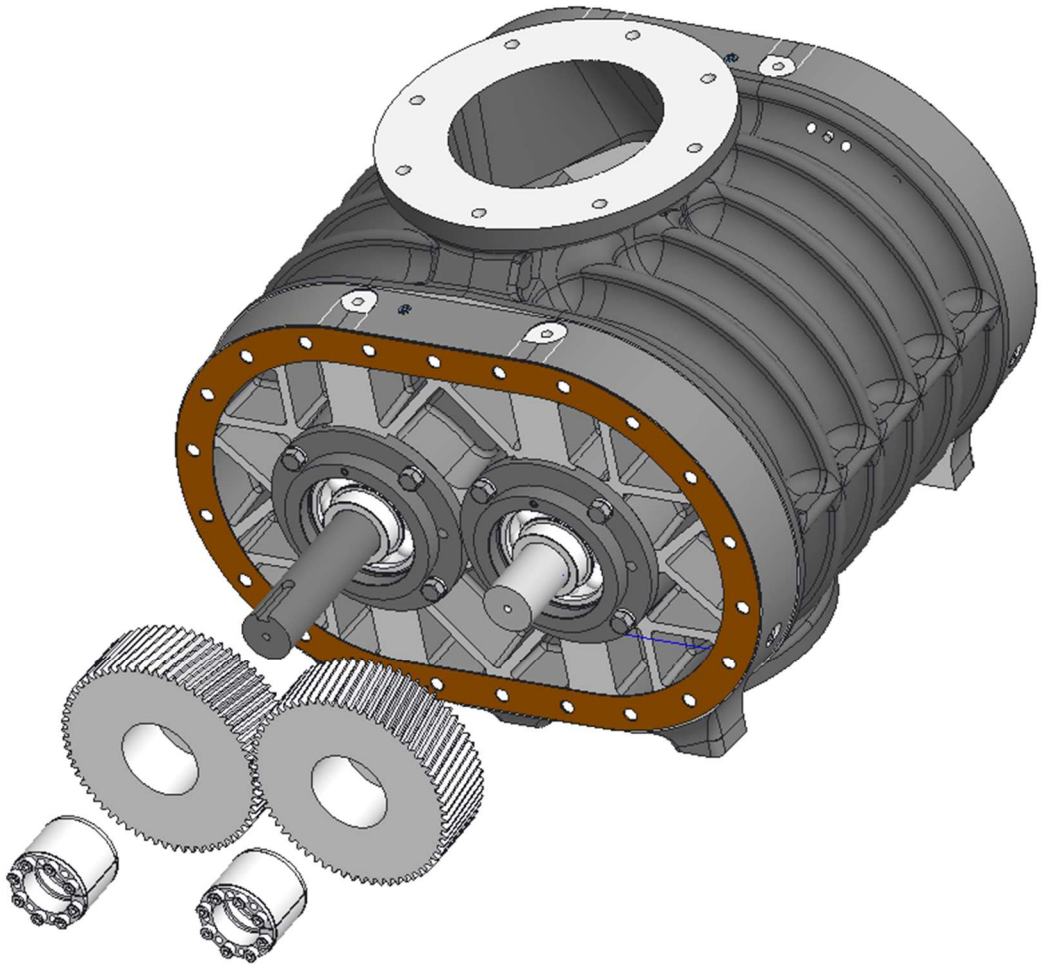
1. A soft hammer is used to ensure that the play that is inherent in the bearings is to the appropriate side and the clearance measurement is truly a minimum clearance measurement.
2. The minimum spec should be taken at the tightest point.
3. When the shims and cartridges are tightened into place and each impeller is hit down toward the drive end that (for a 816 blower) a 0.016” feeler gauge should slide through with no more tension then the standard feeler gauge test everywhere between the headplate and impellers.
4. Check end clearances by sliding a feeler gauge between the impellers and headpleates, and rotate impellers in casing. See clearance specs in the table above.
5. In order to achieve proper clearance follow instructions below.
6. Loosen bearing cartridge bolts at idle end (underneath oil slingers). Lift cartridges with two short 1/2-13 bolts.
7. Adjust end clearances by adding or removing shims based on the results.
8. Reinstall bearing cartridges and recheck the end clearances.



CHECKING AND RESETTING TIMING CLEARANCE

The procedure for resetting timing clearance is as follows

1. Remove the locking bushing on the input (long) shaft by removing the locking screws. Use two locking screws to separate the first piece (inner) from the locking bushing, then use two screws to remove the second (outer) portion of the bushing from the remaining piece of the bushing. Then install new bolts (93-110774-6) loosely into the bushing, maintaining their original position.
2. Place an aluminum plate inside the bottom of the blower, placing the lobe of the idler impeller against the aluminum plate. This plate will stop the idler impeller from rotating.
3. Using a feeler gauge (0.015” for 816, and 0.020” for 1020), space the two impeller lobes apart.
4. Place a 0.004” feeler gauge between the gear teeth, on the leading side of the input impeller to ensure appropriate backlash spacing.
5. Hand tighten the locking bushing screws.
6. Using a torque wrench, tighten the screws in a clockwise pattern, one quarter turn at a time until a torque of 20 ft-lbs is reached on all screws.
7. Remove all feeler gauges and check all timing clearances as per the chart above.
8. If the clearances are within specification, continue to tighten the screws in a clockwise pattern, one quarter turn at a time until a torque of 32 ft-lbs is reached on all screws. If the clearances are not within the required specification, repeat the steps above using a different feeler gauge between the impellers (use a larger feeler gauge if the clearances are too tight at the leading edge, or a smaller one if the clearances are too loose).



SECTION THREE - Repair and Replacement

DISASSEMBLY AND ASSEMBLY OF BLOWER

DISASSEMBLY PROCEDURE

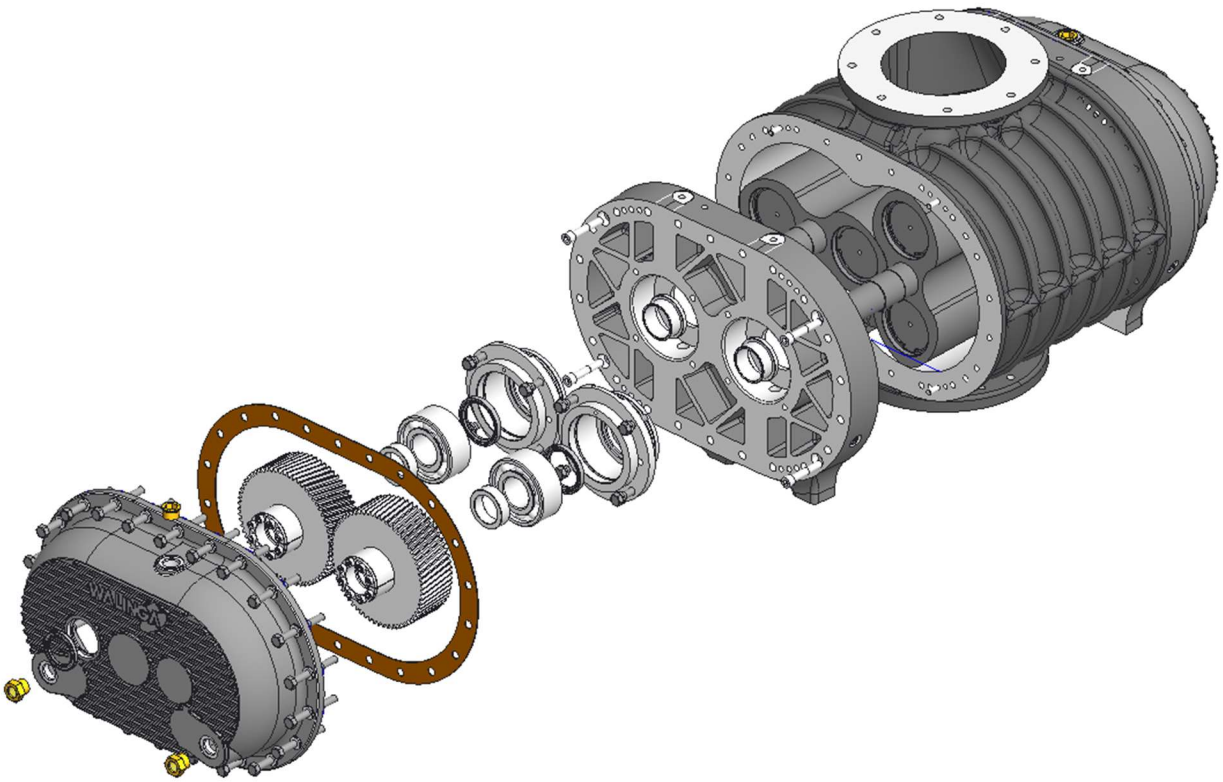
Step	Procedure
1	Drain oil from front and rear oil covers.
2	Remove oil covers.
3	Uninstall the locking bushings by removing the locking screws. Use two locking screws to separate the first piece (inner) from the locking bushing, then use two screws to remove the second (outer) portion of the bushing from the remaining piece of the bushing. Then install new bolts (93-110774-6) loosely into the bushing, maintaining their original position.
4	Remove timing gears and gear spacers.
5	To remove the bearing cartridges, install two long (3” minimum) 1/2-13 bolts in the threaded holes in each cartridge. Remove cartridges from the shafts by evenly turning down these bolts.
6	Remove the oil slingers.
7	Remove retaining rings or plates.
8	Follow step 5 for removal of the bearing cartridges at the blower idle end. Ensure that the shims for each cartridge are kept together and marked clearly.
9	Remove bearings, seals and o-rings from cartridges.
10	Mark position of the headplates on the housing, mark drive end on the housing.
11	Remove the 4 countersunk head cap screws and the 4 dowel pins from each headplate.
12	Remove one headplate.
13	Mark the position of the long impeller in the housing and slide impeller out of housing.
14	Remove the other headplate.
15	Clean all parts and inspect all parts for wear or damage.

ASSEMBLY PROCEDURE

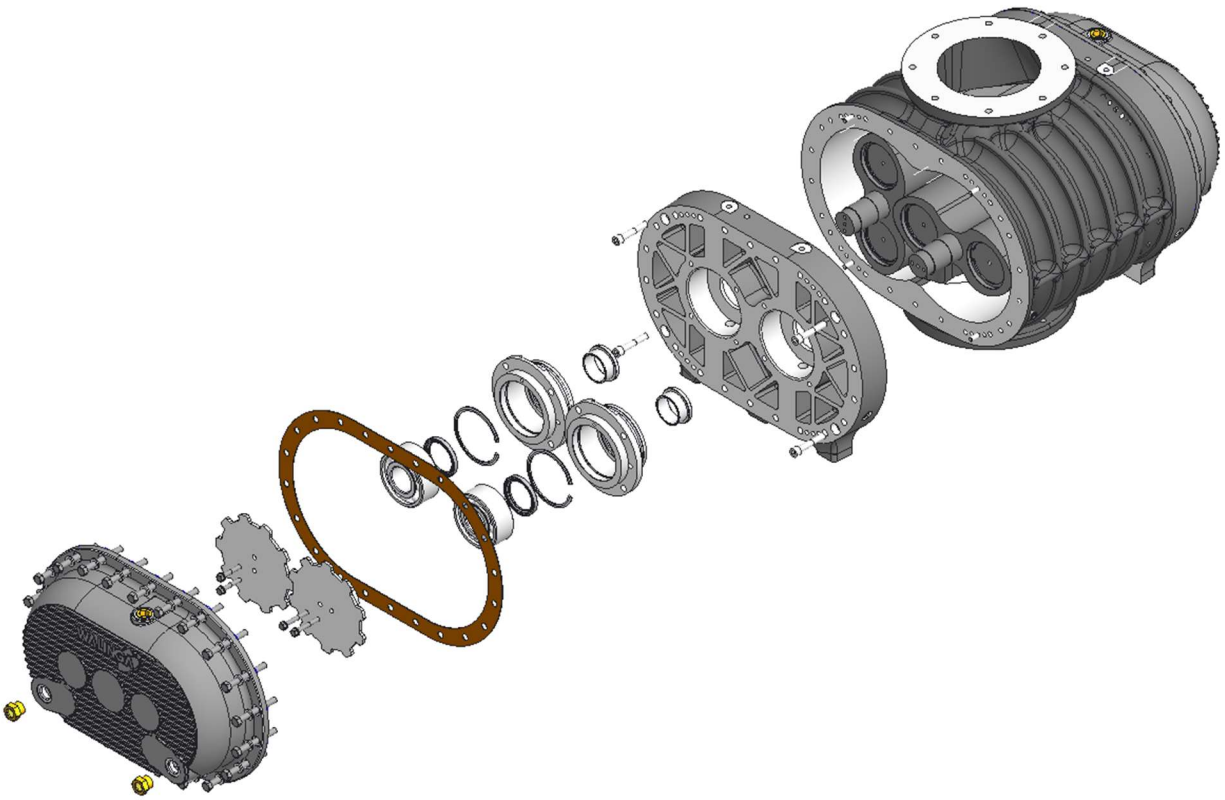
Step	Procedure
1	Set housing on the workbench
2	Install one headplate in the original position using marks to locate. Install the four 3/8 x 2 dowel pins and the four socket cap screws, 1/2-13 x 2-3/4" in countersunk holes. Tighten with a tool until snug. Ensure the feets of the headplate are facing downward.
3	Turn the casing around and install the impellers into the housing as marked. **Ensure that they are installed in the proper orientation (re: step 10 and 13 of disassembly).**
4	Install the other headplate following instructions in step 2.
5	Install new seals and o-rings into bearing cartridges.

6	Check the bearings for wear and damage, replace as needed. Replacement is typically recommended. Install bearings into the cartridges.
7	Reinstall retainer rings in the bearing cartridges for the idle end (oil slinger side) only.
8	With blower oil, lubricate cartridge pockets in the headplates where the o-rings fit and the shaft sleeves where the seals fit. Add a small amount of oil to the shaft where the bearing will be pressed on.
9	Install bearing cartridges onto shafts with a driver. Ensure that the bearing cartridges with the retainer rings (if applicable) are installed on the idle end. **Install original shims underneath the cartridges at the idle end.** **Verify orientation, oil groove must face the top of the blower.**
10	Tighten cartridges by using hex head cap screws (MB 1/2-13-1 3/4 GR8 HH PLTD). For cartridges without retainer rings install retaining plates on the idle end. These retaining plates can become deformed, before installing ensure that they will support the bearing. Flip or replace these plates as needed.
11	Install oil slingers at the idle end.
12	Check and reset tip and end clearanced as described in SECTION TWO.
13	Install gear spacers and timing gears.
14	Insert locking bushings and hand tighten screws.
15	Using a torque wrench, tighten the short shaft locking bushing screws. Tighten screws in a clockwise pattern, one quarter turn at a time until a torque of 20 ft-lbs is reached on all screws.
16	Set timing as described in SECTION TWO.
17	Recheck all clearances and if satisfactory reinstall front and rear covers using new gaskets. **Make sure the input seal hole** in the front cover is **centered** around the shaft. Install new seal.
18	Fill the blower with oil using the level plugs as an indicator.
19	Follow the start-up checklist below for proper procedures.

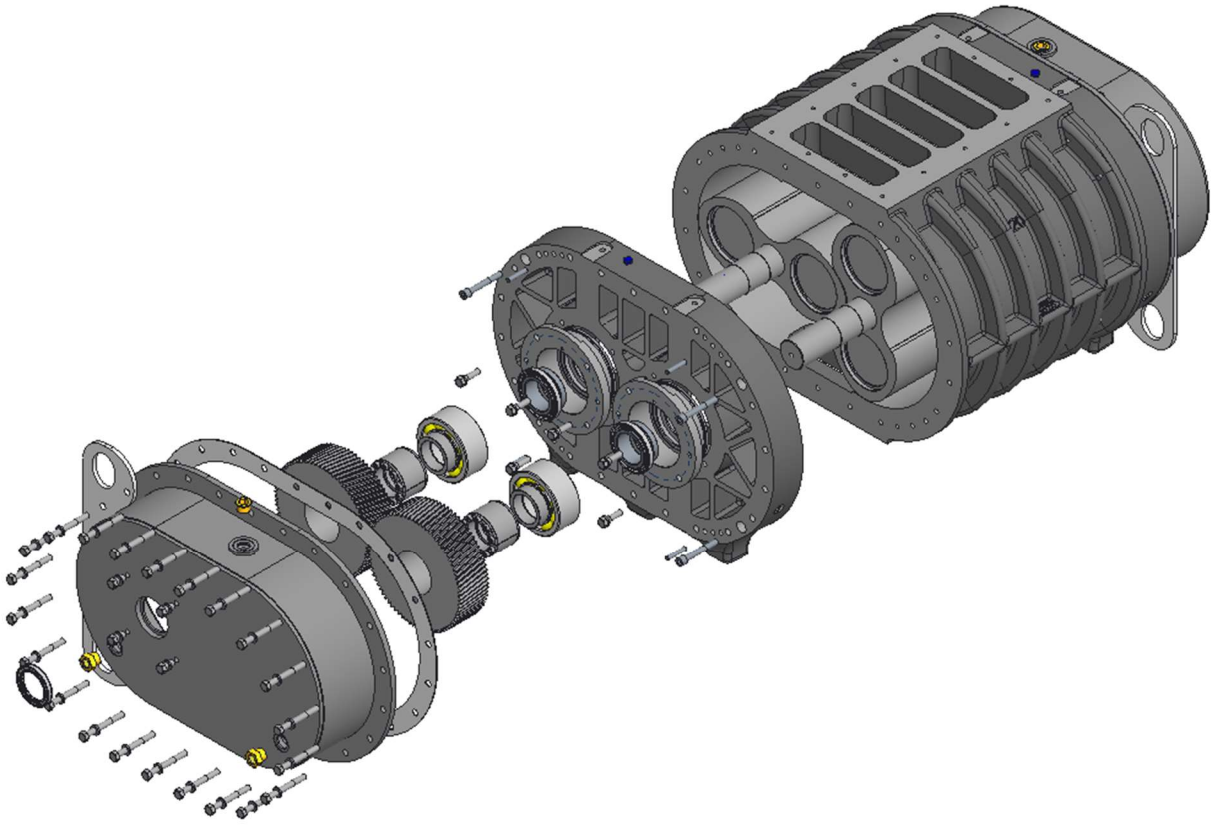
816 Blower Front Components



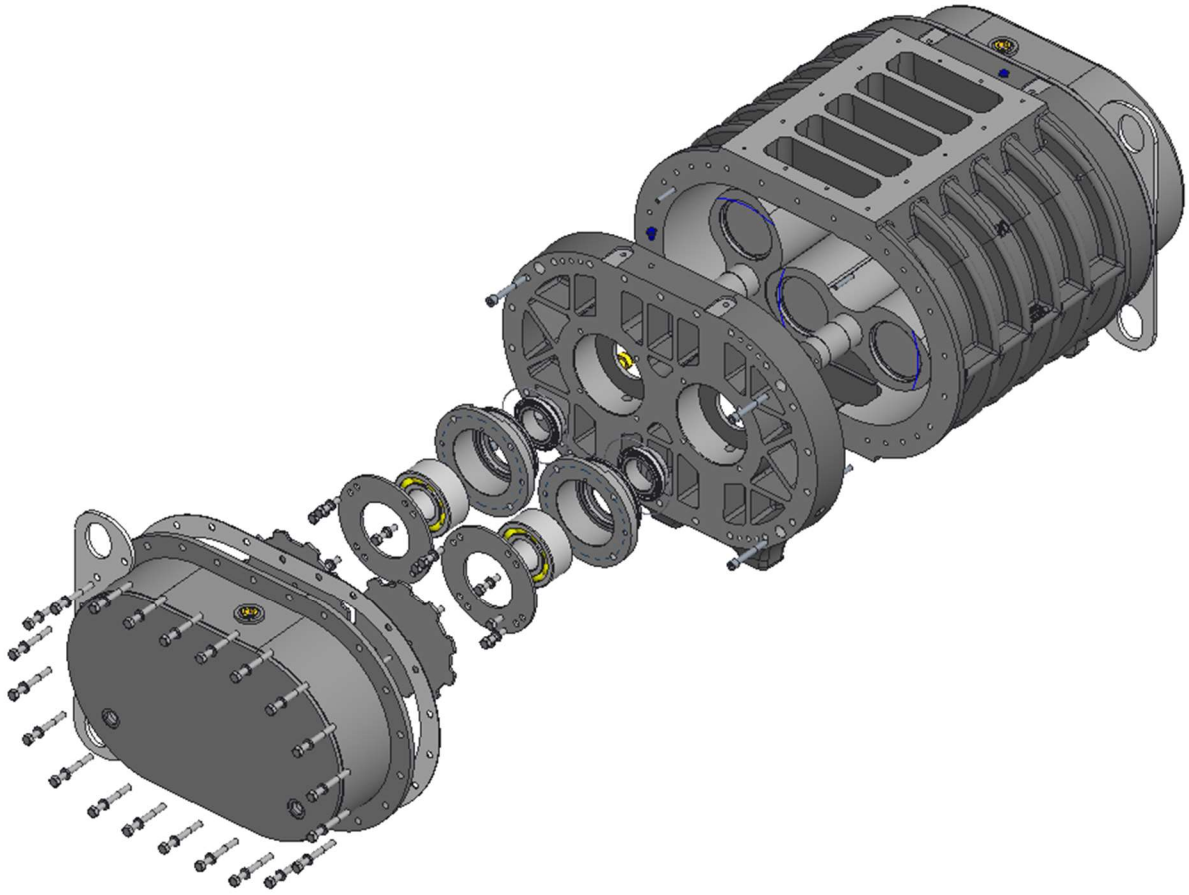
816 Blower Rear Components



1020 Blower Front Components



1020 Blower Rear Components



BEARING AND SEAL REPLACEMENT
Follow disassembly and assembly procedures for instructions on replacing bearings and seals.

REPLACEMENT PARTS LIST

816 BLOWER			
ITEM	QTY	PART NO	DESCRIPTION
1	2	43-132196-6	RETAINING RING,5",5002-0475
2	1	50-105266-4	REAR COVER,8",MACHINED
3	1	50-105267-4	FRONT COVER,8",MACHINED
4	1	50-117595-5	OILSLINGER,816,2L
5	2	50-76943-4	HEADPLATE, 816
6	1	50-76945-4	CASING, 816, M/C
7	1	50-76950-5	IMPELLER 816, 30-1/2
8	2	50-76954-4	GEAR/BEARING SPACER, 816
9	4	50-76955-4	SHAFT SLEEVE, 816, 1.200LG
10	1	50-76958-4	GEAR, 816, RH
11	1	50-76960-4	GEAR, 816, LH
12	1	50-76971-5	IMPELLER 816, 26-1/2
13	1	50-77207-5	OILSLINGER, 816, 1-1/2L
14	4	50-90083-5	Bearing Cartridge, 816, Assy
15	2	58-00167-6	PLUG, BLK, 4MP, HEX SOCKET C/SUNK
16	4	58-19689-6	PLUG, 12MB
17	4	58-19690-6	PLUG, 12MB, W/SIGHT WINDOW
18	4	58-80675-6	PLUG, 6MB, W/MAGNET
19	4	94-04285-6	LOCKWASHER, 3/8, PLTD, REGULAR
20	52	94-04305-6	LOCKWASHER, 1/2, PLTD, REGULAR
21	8	94-05293-6	MB 1/2-13-1 3/4 GR8 HH PLTD
22	44	94-05297-6	MB 1/2-13-4 GR8 HH PLTD
23	2	94-05320-6	MB 3/8-16-2 GR8 HH PLTD
24	2	94-05322-6	MB 3/8-16-2 1/2 GR8 HH PLTD
25	8	94-67673-6	Dowel Pin, 3/8 x 2
26	8	94-92365-6	SK HD Cap Screw, 1/2-13 x 2-3/4"
27	4	96-76364-6	SEAL,65x85x10 HMSA10, 692613
28	1	96-76373-6	Seal, 2x2.75x.313 TB2/V
29	4	96-76961-6	BEARING, BALL, 3311JC3
30	4	96-76969-6	O-RING, VITON, 2-254
31	2	96-95987-6	GASKET, 816 OILCOVER
32	2	97-76962-6	LOCKING BUSHING, KEYLESS,2,B122200
33	11	98-19152-6	OIL, SYNTH, BLOWER, SYNDURO, SHB460

1020 BLOWER			
ITEM	QTY	PART NO	DESCRIPTION
1	1	50-114874-4	IMPELLER,1020,39
2	4	50-115393-5	BEARING CARTRIDGE,1020 ASSY
3	1	50-117597-5	OILSLINGER,1020,2L
4	2	50-126962-4	LIFTING HOOK,BLOWER,1020CHR
5	1	50-132380-5	IMPELLER,1020,32.5
6	1	50-67466-4	CASING, 1020, M/C
7	2	50-67467-4	HEADPLATE, 1020
8	2	50-67495-4	GEAR/BEARING SPACER, 1020
9	1	50-67496-4	GEAR, 1020, RH
10	4	50-67500-4	SHAFT SLEEVE, 1020, 1.500LG
11	2	50-67501-4	BEARING RETAINER PLATE, 1020
12	1	50-67647-6	SHIM, CARTRIDGE, 1020, 0.009"
13	1	50-67651-4	GEAR, 1020, LH
14	1	50-67656-5	OILCOVER, FRONT, 1020
15	1	50-67670-5	OILCOVER, REAR, 1020
16	1	50-67671-5	OILSLINGER, 1020, 1-1/2L
17	1	50-68037-5	SHAFT COVER, 1020
18	2	50-71579-6	LOCKING BUSHING, KEYLESS,2-1/2,B122208
19	2	58-13838-6	PLUG, BLK, 4MP, W/5/8 HEX HEAD
20	4	58-19689-6	PLUG, 12MB
21	4	58-19690-6	PLUG, 12MB, W/SIGHT WINDOW
22	4	58-80675-6	PLUG, 6MB, W/MAGNET
23	4	94-04285-6	LOCKWASHER, 3/8, PLTD, REGULAR
24	68	94-04305-6	LOCKWASHER, 1/2, PLTD, REGULAR
25	8	94-05290-6	MB 1/2-13-1 GR8 HH PLTD
26	8	94-05293-6	MB 1/2-13-1 3/4 GR8 HH PLTD
27	8	94-05294-6	MB 1/2-13-2 GR8 HH PLTD
28	44	94-05297-6	MB 1/2-13-4 GR8 HH PLTD
29	2	94-05321-6	MB 3/8-16-2 1/4 GR8 HH PLTD
30	2	94-05323-6	MB 3/8-16-2 3/4 GR8 HH PLTD
31	8	94-67672-6	SK HD CAP SCREW 1/2-13-3 1/2
32	8	94-67673-6	Dowel Pin, 3/8 x 2
33	2	96-113652-6	GASKET,1020 OILCOVER
34	1	96-123425-6	1020 SHAFT COVER GASKET
35	4	96-67834-6	Bearing, Ball #3313JC3
36	1	96-67849-6	Outboard Seal, 2.500 x 3.500 x .437
37	4	96-67850-6	Main Seal, 85 X 110 X 12 TC/V
38	4	96-67852-6	O-Ring, 6.250 x 6.500 x .139
39	13	98-19152-6	OIL, SYNTH, BLOWER, SYNDURO, SHB460

TROUBLESHOOTING

The function of troubleshooting is to locate quickly and to correct the cause of faulty operation and failure of equipment. No matter how well equipment is designed and manufactured, there may be times when faults will develop and failures will occur during operation.

Whenever equipment fails to operate satisfactorily, the operator or repairman must be able to locate the cause and correct the trouble as quickly as possible. The trouble chart below is provided to assist in recognizing the cause of common faults and in correcting them quickly.

Problem	Possible Causes	Solution
Knocking	Unit out of time	Retime
	Distortion due to improper mounting or pipe strains	Check mounting alignment and relieve pipe strains
	Excessive pressure differential	Check manufacturer's recommended pressure, check relief valves
	Worn timing gears caused by improper lubrication or overloading	Replace timing gears
Knocking in open and/or closed position	Worn bearings	New bearings
	Worn bearing cartridges	Replace cartridges
Broken Shaft	Excessive overhung load	Replace shaft and recheck drive for overhung loads
Excessive Heating	Too much oil in gear case	Check oil level
	Incorrect speed to pressure ratio	Check ratio
	Gear case not properly vented	Clean vents
Excessive heating or motor overloading	Clogged filter or muffler, incorrect installation of check valves	Remove cause of obstruction
	Excessive line loss (Pressure)	Check pressure differential directly across blower
Sudden motor overloading	Excessive pressure in the system	Check valves and line for plugging
Headplate overheating, excessive end clearance wear.	Misaligned V drive	Align V drive
Lack of Volume	Clogged filter or muffler, incorrect installation of check valves	Remove cause of obstruction
Excess bearing or gear wear	Improper lubrications	Correct oil level – dirty oil – check for obstructions in the oil lines and strainer in force feed units
Excessive gear wear	Oil too light	Use recommended weight of oil
Lack of oil pressure on the force feed units	Dirty suction screen	Clean suction screen
Poor Performance	Restricted inlet	Remove cause of restriction
	Downstream restriction	Remove cause of restriction
	Excessive air to product ratio	Reduce air intake
	Air leakage	Check and repair any faulty seals
	Insufficient blower speed	Increase to proper R.P.M.
	Excessive impeller clearance	Check clearances and replace worn components

INSTALLATION AND LUBRICATION
BLOWER STARTUP CHECKLIST

This start-up procedure should be followed during initial installation and after any shutdown period or after the blower has been worked on or moved to a new location.

1. Check the unit and all piping for foreign material and clean if required.

2. Check the level and alignment of the drive. Misaligned V-drives can cause the impellers to rub against the headplates and cause a reduction in the volumetric efficiency of the unit. Misaligned couplings can ruin bearings.

3. Check the unit for proper lubrication. Proper oil level cannot be overemphasized. Too little oil will ruin bearings and gears. Too much oil will cause overheating and can ruin gears and cause other damage.

4. Turn the unit over by hand to be certain it does not bind.

5. “Jog” the drive to check rotation and to be certain it turns freely and smoothly.

6. Apply the load and observe the operation of the unit for one hour. Check frequently during the first day of operation

7. If malfunctions occur, do not continue to operate. Minor problems, such as knocking impellers, can cause serious damage if the unit is operated without correction.

8. Fill in and return the warranty card (if applicable).

Blower Repair & Maintenance Manual

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