



National Vacuum Equipment



Owner's Manual

43 Series Challenger Tri-Lobe Blower



800-253-5500

| natvac.com

4307 & 4310 BLOWERS

Owner's Record

Date of Purchase: _____

Purchased from: _____

Serial Number: _____

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Revision: 8 (Released) August, 2017

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INTRODUCTION

General Information



About National Vacuum Equipment

Congratulations! You now own a quality vacuum/pressure Blower proudly manufactured in the U.S.A. by National Vacuum Equipment, Inc. You have not only acquired a superior piece of equipment from a qualified dealer, you have hired a team of vacuum experts. We stand ready to work with your dealer to answer your questions and provide you with the information necessary to keep your equipment in peak working condition.

Thank you for putting your trust in National Vacuum Equipment.

Our Mission

We are dedicated to the production and wholesale distribution of quality vacuum system products at a reasonable price, on a timely basis. We are a “one-stop shop” for manufacturers and distributors of vacuum equipment.

Our History

National Vacuum Equipment, Inc. was founded in 1980 by Bruce Luoma. The Company started as a retailer of vacuum pumps. Soon after it started, the Company secured the rights to exclusive distribution of the Battioni vacuum pumps in North America. This helped the Company to evolve into its current status as a wholesale supplier.

To reach the goal of becoming a full service supplier of vacuum system components, the Company began fabrication of its own line of componentry, purchased and developed its own line of vacuum pumps, and began purchasing for resale, various valves and accessories.

Today, NVE has full service machine, fabrication and powder-coating shops complete with CNC-controlled production equipment designed for close tolerance work. The company has a highly trained staff, all of whom are dedicated to quality.

LIMITED WARRANTY

Warranty

National Vacuum Equipment, Inc. guarantees that the product it provides is free of manufacturer's defects, including materials and workmanship. Properly installed and maintained product is warranted for a period of one (1) year subject to the following conditions:

1. A properly completed warranty registration card must be received by us within 30 days of sale to end user for pump sales to be considered warrantable. All pumps received for warranty consideration must retain the original NVE serial number tag.
2. The one (1) year period shall begin the day the product is shipped from our warehouse, unless we are provided with an authentic copy of the original resale invoice, in which case the one (1) year period shall begin at such invoice date.
3. The covered product must be used in an application for which it was intended. We do not recommend our product for particular uses or applications.
4. Damage caused by improper use or lack of proper maintenance is not warrantable.
5. Manufacturer's liability under this or any other warranty, whether express or implied, is limited to repair of or, at the manufacturers' option, replacement of parts which are shown to have been defective when shipped.
6. Manufacturer's liability shall not be enforceable for any product until National Vacuum Equipment, Inc. has been paid in full for such product.
7. Except to the extent expressly stated herein, manufacturer's liability for incidental and consequential damage is hereby excluded to the full extent permitted by law.
8. Manufacturer's liability as stated herein cannot be altered except in writing signed by an officer of National Vacuum Equipment, Inc.
9. Certain products provided by National Vacuum Equipment, Inc. are covered by their respective manufacturer's warranties (e.g., engines used in the NVE engine drive packages). These products are not covered by the National Vacuum Equipment, Inc. Manufacturer's Warranty.

Warranty Procedures

Should a potential warranty situation arise, the following procedures must be followed:

- Contact your dealer immediately upon the occurrence of the event and within the warranty period.
- Customer must receive a return goods authorization (RGA) before returning product.
- All serial-numbered products must retain the NVE serial number tag to be qualified for warranty.
- Product must be returned to NVE intact for inspection before warranty will be honored.
- Product must be returned to NVE freight prepaid in the most economical way.
- Credit will be issued for material found to be defective upon our inspection, based upon prices at the time of purchase.

4307 & 4310 TRI-LOBE BLOWERS

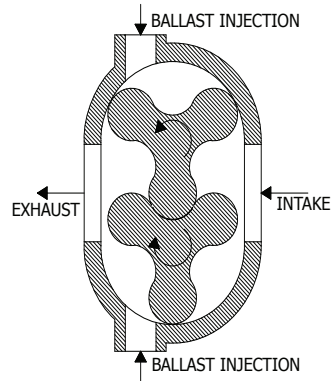
NVE 4307 & 4310 TRI-LOBE BLOWERS



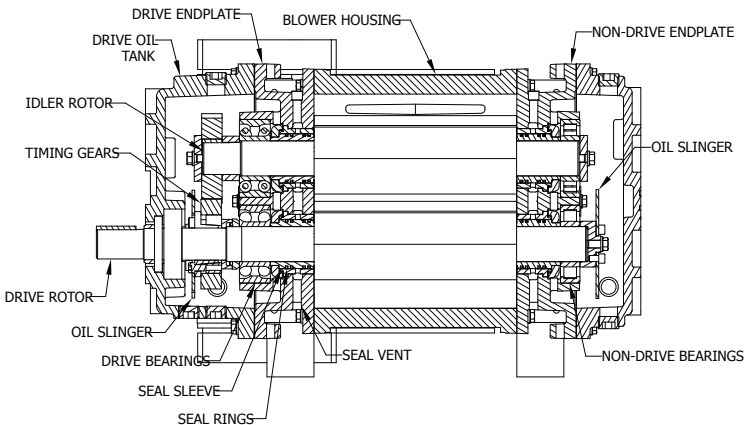
General Blower Operation

The NVE BLOWERS are severe duty vacuum pumps, designed to be used in liquid waste pumping systems where extended operation is desired. The blower incorporates a ballast air cooling system to provide superior cooling, allowing for extended operation.

The air enters the intake under vacuum or at atmospheric pressure. As the rotors rotate, a fixed volume of air is moved along the wall of the cylinder towards the exhaust where the pressure and temperature of the volume of air increases. If the intake air is below atmospheric pressure, cooling air will be drawn in when the rotor tip passes the ballast port. The airflow capacity of the machine (in ACFM) is nearly proportional to the speed of the machine and is nearly constant with changes in inlet or outlet pressures.

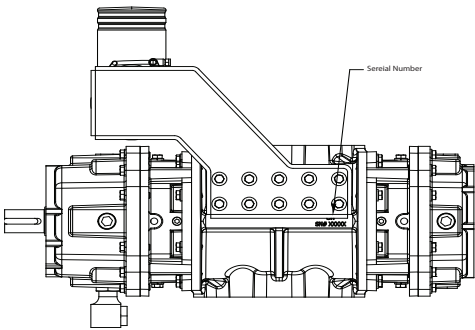


General Blower Construction



Location of Serial Number

Each blower should have a brass colored tag with an embossed serial number. In addition, the serial number and blower direction as assembled at the factory are stamped into the top of the housing as shown:



Specifications

Operating Environment

The 4307 and 4310 blowers are designed to move atmospheric air. Do not use to move explosive or corrosive gasses or operate the blower in an area with explosive gases. Any materials in the intake air must be filtered and separated from the air by means of an intake filter, moisture trap and/or a cyclonic filter.

The ballast inlet must be positioned and protected from ingesting debris, fluid or explosive gases.

Operating Limits

The blower must be operated within all limits at all times. This typically means the blower performance is limited by the exhaust temperature and temperature rise over ambient for the blower.

Size	RPM		Inlet Vac	Pressure Rise+ (psig)	Exhaust Pressure (psig)	Inlet Temp (°F)	Exhaust Temp (°F)	Temp Rise#	Ballast Inlet Temp (°F)
	Max	Min	Max	Max	Max		Max	Max	
4307	4000	2500	FULL VAC	14	10	*	380	235	*
4310	4500	2500	FULL VAC	14	10	*	380	260	*

*Exhaust temp and temp rise limited, †Pressure rise is from inlet to outlet, ‡Temperature rise is exhaust minus ambient temperature surrounding blower (note if enclosed)

Performance (Reference Only)

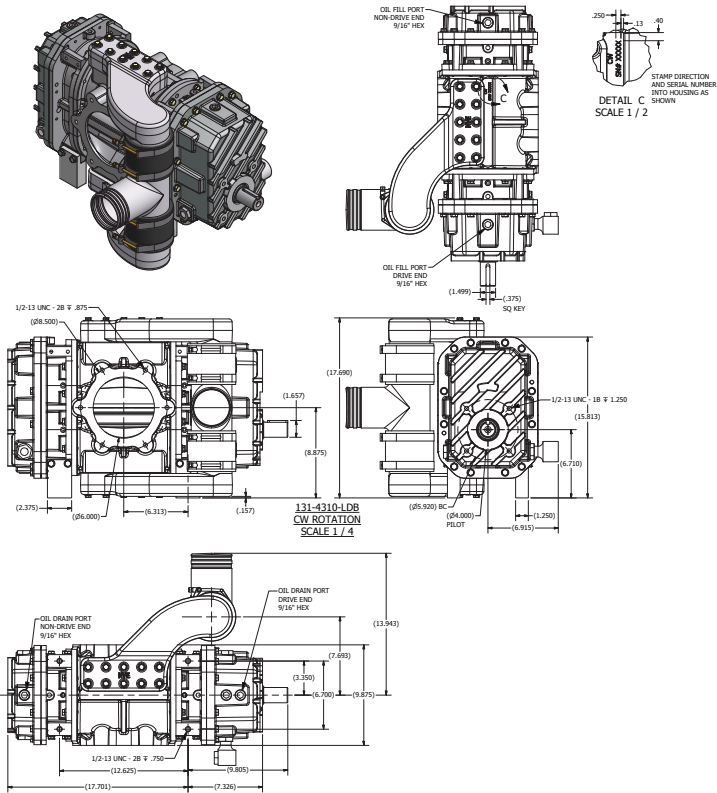
4307		Vacuum (Inches of Mercury)							Pressure (PSI)	
RPM		0	9	15	18	21	24	27	5	10
2000	HP	2.0	8	11	13	15	17	-	8	15
	CFM	280								
2500	HP	2.5	10	14	16	19	21	-	10	18
	CFM	349								
3000	HP	3	11	17	20	22	25	28	12	22
	CFM	419								
3500	HP	3.5	13	20	23	26	29	32	15	25
	CFM	489								
4000	HP	4.0	15	22	26	30	33	37	17	29
	CFM	559								

4310		Vacuum (Inches of Mercury)				
RPM		0	18	24	27	10
2400	HP	2	18	24	-	25
	CFM	500				
4000	HP	4	36	47	52	40
	CFM	826				
4500	HP	5	40	52	58	45
	CFM	931				

The maximum allowable operating vacuum will vary depending on R.P.M., ambient temperature, altitude and time running. The basic principle to keep in mind is - faster R.P.M., higher air temperature and longer run time all equal more heat in blower. When installing an NVE 4307 or 4310 blower we recommend a normal R.P.M. of 4000. Other speeds are ok as long as exhaust gas temperatures read on the supplied thermometer do not exceed 380 degrees F. Maximum of 4500 R.P.M is for intermittent use only.

Weights and measurements are for reference only.

Dimensions



Air Flow Control

The airflow rate on the blower can be adjusted by changing the speed of the blower. This can be accomplished by changing the PTO ratio, gearbox ratio, belt drive pulley diameters or engine speed.

Sound Level

It is recommended the operator monitor the blower while running and listen for resonances (increased levels of noise) that may occur at certain RPM's and operate the blower at speeds above or below the resonance speeds to reduce excess noise.

The noise level of the blower may increase with higher levels of vacuum and RPM. To minimize noise, operate the blower at the minimum speed and vacuum level required to achieve the desired performance results.

Limitations of Use

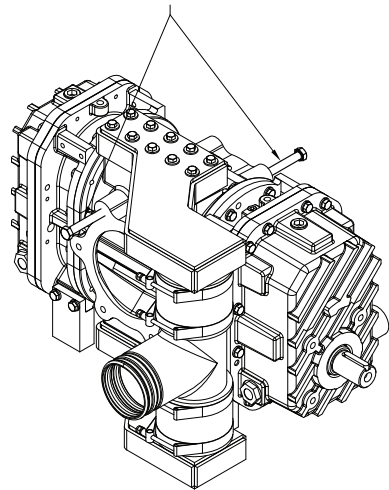
Limitation of Use	Reason for Limitation and/or Risk	Corrective Actions
Operation of the blower in an explosive environment	Fire and/or explosion can result	DO NOT USE
Using blower to move explosive, toxic or dangerous gases	Fire and/or explosion can result Pollution of the environment Health risks to operators	
Liquid drawn into blower intake	Blower seizure, damage to blower and ejection of parts	
Operation with the exhaust or ballast blocked off.	Overheating	Remove the blockage and minimize restriction in the exhaust or ballast circuits
Rotating blower in wrong direction	Damage to blower	Change the direction of rotation of the drive or order correct rotation of blower.
Operating in excess of recommended speed	Seizure of blower, damage to blower and ejection of parts	Operate the blower within recommended speed range
Operating blower below minimum speed	Seizure of blower, damage to blower and ejection of parts	
Exceeding the maximum pressure rise from blower inlet to outlet	Overheat of Blower Fire Seizure of blower, damage to blower and ejection of parts	Check inlet and exhaust restrictions and reduce as necessary.
Operating at excessively hot inlet or ballast temperatures	Overheating Fire Seizure of Blower, damage to blower and ejection of parts	Monitor the inlet temperature and make corrections to the system to bring temperature within limits.
Operating at excessively cold inlet temperatures.	Seizure of Blower, damage to blower and ejection of parts	Review precautions in cold weather conditions. Use recommended lubrication.
Operating above the exhaust temperature upper limit	Overheating Fire Seizure of Blower, damage to blower and ejection of parts	Reduce the vacuum level in high ambient conditions. Reduce the blower speed. Remove restrictions in the intake and exhaust circuits.
Operating in excess of the specified temperature rise across the blower	Seizure of Blower, damage to blower and ejection of parts	Reduce the vacuum or pressure level to bring within limits.

STORAGE

Unpacking Blower

When unpacking the blower or blower package from the skid, verify the packing list matches the product supplied and that no visible damage has occurred during shipping. In the event damage has occurred, first file a claim with the carrier and then contact NVE for assistance.

Keep all intake, exhaust and ballast ports covered to prevent accidental ingestion of materials into the blower.



Handling

Use an appropriately sized lift strap for lifting the blower. Thread two 1/2-13 UNC x 4" LG grade 8 bolts into the flange holes as shown.

	Model	Weight (lbs)
4310	4310-LD	349
	4310-LDB	360
	4310-LDM	456
4307	4307-LD	321
	4307-LDM	421

Preservation

Keep all intake, exhaust and ballast port coverings in place to prevent debris or liquids from entering blower. Reapply rust preventative oil to all metal parts, including the compression chamber every 6 months or more frequently if the relative humidity is greater than 80%.

While in storage, rotate the shaft three to four revolutions every two weeks to keep gears coated in oil.

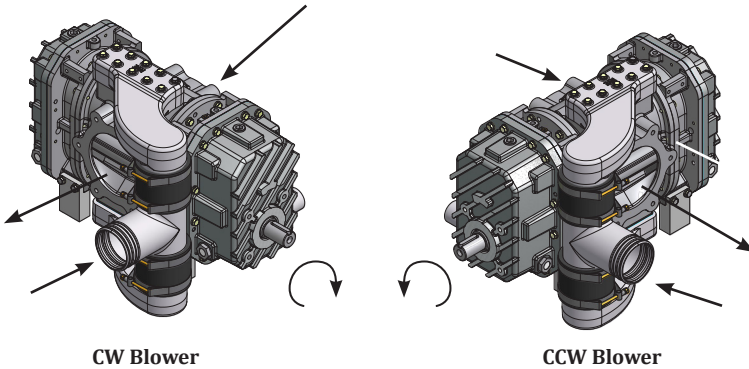
Before installing a blower that has been stored for any length of time, remove the intake and exhaust covers and inspect the rotors and cylinders to insure the absence of rust. In addition, remove the oil fill plug on drive oil tank and inspect the gear for absence of rust.



- Use a rust preventative oil with a flash point over 400 °F
- Dispose of used rust preventative oil according to local regulations

INSTALLATION

Rotation and Airflow



Diesel Engine Precautions



- Do not operate blower with a diesel engine running at low RPMs as torque pulses can cause rotor lobe contact and damage to the blower.

When directly driving the blower with Diesel engine, bring the engine up to operating RPM and then engage the blower via the clutch. Be sure to start the blower under no load conditions.

Use caution when using a Diesel engine that is significantly oversized for the operating point of the blower. Doing so can result in an inertial mismatch, excess torsional vibrations at low RPM's and blower lobe contact.

Direct Coupler Installation and Alignment

Slide the couplers onto the blower shaft and prime mover shaft using appropriate tools.



- Do not use a hammer to slide the couplers onto the shaft as this may result in blower damage.
- Failure to properly align the couplers can cause premature wear of the blower bearings and coupler sleeve.
- Couplers must be guarded to prevent entanglement.

Belt Drive

All NVE blower input shafts are equipped with an outboard roller bearing which allows the use of V-belt.

The driving pulley from the prime mover must be mounted on the intake side of the blower to prevent unloading of the blower bearings.

Use a narrow hub sheave and insure that the inner hub face is not more than 1/4" from the face of the gearbox. Be sure to also use an adjustable belt tensioning system to allow compensation for belt wear.



- Excessive or insufficient belt tension could damage the blower and prime mover.
- Belts and pulleys must be guarded to prevent entanglement.
- Regularly check all bushing fasteners for proper torque. Especially when new or after service.

Use matched sets of V-belts to insure uniform torque transmission. If a belt goes out, replace the whole set.

Drive Shaft

U-Joint operating angles at each end of the shaft should always be at least 1° to prevent yoke bearing failure, but do not exceed the manufacturers maximum recommended angles for the operating RPM.

U-Joint operating angles on each end of a driveshaft should always be equal within 1° of each other to cancel an angle vibration.

For more driveline installation detail, please see the Dana-Spicer Driveline Installation Document J3311-1-DSSP available free from <http://www2.dana.com/pdf/J3311-1-DSSP.pdf>.



- Use a drive shaft loop to catch shaft in the event of failure.
- It is suggested that overload protection be used on the blower driveline.

Hydraulic Drive

The blower can be driven with an appropriately sized hydraulic system utilizing a hydraulic motor with an SAE B or C, 4-bolt or 2-bolt flange by purchasing a hydraulic mount (purchased separately) and appropriate couplers.

PTO Drive

PTO's must be properly sized to drive the blower. For more information on driving blowers with PTO's, please see the Chelsea Blower Torque Guide Bulletin HY25-0075-B1-US available at www.parker.com.



- Improper use of “Hot Shift” (i.e. clutch type, constant mesh) PTO's can result in severe damage to the blower driveline and blower. Take extra precautions to operate PTO's within the manufacturer's recommendations

Plumbing and Piping

Do not hang plumbing from blower flanges. Use isolating flanges or isolating hose to couple blower to piping to prevent dead weight from hanging off blower and to allow for thermal expansion. Failure to do so may result in rotor contact with housing. Use only clean piping insuring it is free of dirt, scale, cuttings, weld spatter, and foreign materials of any kind.

The intake and exhaust system can be plumbed with 4" or 6" hose. Four inch hose will provide a more compact system while the 6" hose will maximize the efficiency of the system.

The ballast system should be plumbed using 4" hose minimum. Be sure to locate the ballast inlet away from heat, debris and fluid sources as exposure to these may result in damage to the blower.

RECOMMENDED ACCESSORIES

Exhaust and Ballast Silencer

Positive displacement blowers are inherently noisy due to their design. NVE offers compatible silencers for the exhaust to reduce decibel levels in the operating environment. If using a non-OEM silencer, it should be tested for effectiveness by blanking off the inlet and monitoring exhaust gas temperature with the blower running for at least one hour. The blower should not exceed specified exhaust gas temperatures.

Inlet Filter

The intake filters are designed to ensure maximum airflow efficiency while keeping out unwanted debris. The filters supplied by NVE use a stainless steel screen and can be cleaned.

Four Way Valve and Hoses

If it is intended to operate the blower in the pressure mode, a four way valve will be required. The 4-way valve size should match the hose size used in the application.

Check Valves

For vacuum only setups, the blower system will need to have an appropriately sized check valve on the inlet side of the blower. If the blower is to be operated in a pressure mode, a check valve will need to be used on both the ballast air system and the intake side of the blower. Note that the ballast circuit normally draws air into the blower. Use the same size check valve as the hose used to plumb the system.

Primary Shutoff

A primary shutoff is to be used with the blower as a first line of defense to prevent liquid from entering the blower. It is critical that an appropriately sized primary shut off is used. Contact NVE for assistance with selecting the shutoff.

Secondary Shutoff/Moisture Trap

The secondary shutoff or moisture trap should also be appropriately sized for the air flow application. Contact NVE for assistance with selecting the shutoff.

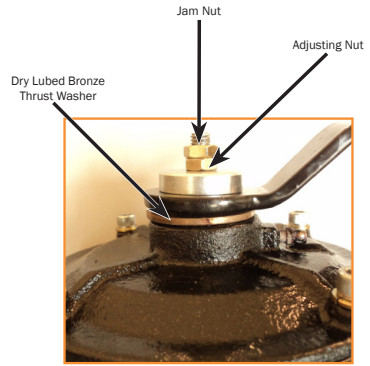
Bag House

Bag houses are typically used in systems where dry material is being pumped. Specification of a proper bag house depends on the frequency and type of dry material being pumped. Consult the factory for assistance in selecting a bag house.

Four Way Valve



- Ensure system is free of vacuum/pressure.



4-Way Plug Adjustment Procedure:

Use at initial installation or for adjustment use steps 6 to 10.

1. Remove all hardware from center thread
2. Install Brass washers and place handle into proper fit position based on your installation direction.
3. Install cup washer and adjusting nut and secure to at least finger tight.
4. Turn the adjusting nut a half to $\frac{3}{4}$ turn to pull the plug off seat position
5. Test valve movement: Valve should move freely
6. If valve does not move freely, review for other obstructions or tighten adjusting nut by $\frac{1}{4}$ turn until free movement occurs.
7. Once free movement is established install jam nut until finger tight
8. Use two wrenches and tighten jam nut while holding adjustment nut steady
9. Test valve movement: Valve should move freely
10. Valve is now adjusted and ready for installation.

Note: Use narrow wrench to hold adjusting nut while tightening jam nut.

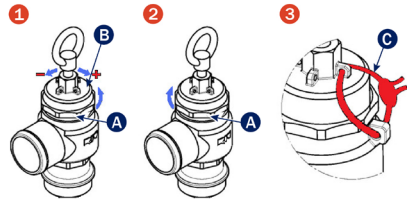
Pressure Relief Valve

If the blower is intended to be used in pressure mode then a pressure relief valve is required. NVE recommends the use of Kunkle pressure relief valves as they have been proven to work well and have sufficient flow capacity.

Pressure Relief Valve Setting Instructions

Pressure Relief Valve

- Picture 1. 1. Unscrew the lock nut "A"
2. Turn the spring-tightener "B"



Picture 2. Once obtained the desired pressure, screw down the lock nut "A"

Picture 3. Fix the setting, using the rings "C" Situated on the body and on the spring tightener



- Pressure relief valves should only be adjusted and/or serviced by trained individuals.

OPERATION

Initial Start Up Preliminary Checks

Before operating a blower that has been stored for any length of time, remove the intake and exhaust covers and inspect the rotors and cylinders to insure the absence of rust. In addition, remove the oil fill plug on the drive oil tank and inspect the gear for absence of rust.

Verify the blower spins freely by hand.

Verify all connections between the plumbing system and the blower flanges are in place and tight.

Verify oil levels through sight eyes. If additional oil is required, see the maintenance section for details.

Verify the blower is set-up to spin the correct direction, especially when using a gearbox.

Verify all guards are in place.



- Insure personnel wear hearing protection as noise levels can exceed 85 dB.
- Do not rotate the blower in the reverse direction.

Starting the blower

HOT Shift PTO's - Do not engage "Hot Shift PTO's" outside of manufacturers specifications as damage to the PTO, driveline or blower may occur. Slowly ramp the blower up to speed to prevent shocking the system.

Increase the vacuum level slowly until the rated level is reached. During the first 8 hours of operation, check that there are no vacuum leaks, oil leaks, vibrations or strange noises.

Operating

Start the blower and check the appropriate parameters as listed in the maintenance schedule under the Maintenance section.

Stopping the Blower

When stopping the blower, if possible, remove all vacuum and pressure from the blower.

Cold Weather Operation

During very cold weather conditions, always warm the blower before operating at full rated vacuum or pressure. Damage to the blower can result from operating for short intervals in very cold weather conditions.

If using a coupler with a rubber jaw or sleeve in shear during extremely cold weather, take note that elastomeric materials become stiffer in cold weather.

This results in a reduction of the shear protection in the event of a lock up of the blower because the jaw or sleeve can handle more torque before giving way.

If hydraulically driving the blower, allow the hydraulic fluid to warm up before operating the blower at full load. Use the correct viscosity of hydraulic oil for the operating temperature as recommended by the manufacturer of your system.

Before starting blower, verify the shaft rotates freely by hand. Water can condense and freeze in the blower cylinder without warning causing a stall condition at start up.

Check the intake filter and air intake daily. If snow is present, check the air intake more frequently.

DO NOT thin out the oil in the gear cases with any other fluids such as Kerosene. Use the recommended oil for the operating temperatures.

If temperatures are so cold that the blower cannot warm up, enclose the blower allowing for sufficient clearance from parts to prevent contact with hot or moving components.

MAINTENANCE

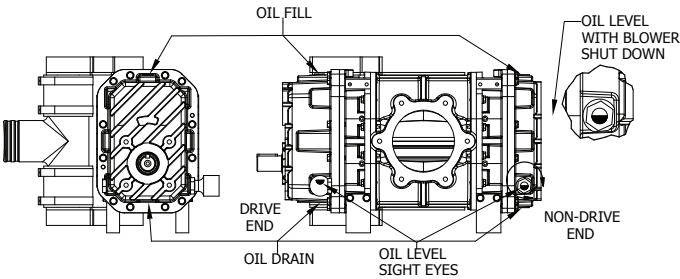


- LOCK OUT any equipment before performing maintenance.
- Remove all pressure and vacuum from the system, i.e. discharge any stored energy in the system.
- Allow the blower to cool to below 100 °F before beginning work to prevent burns.

MAINTENANCE SCHEDULE						
CHECK	PARAMETER	FREQUENCY				COMMENTS
		H	D	W	M	
VISUAL	Pressure		1			Blower Running
	Temperature		1			
	Load-Absorbed Power		1			
	Noise		1			
LUBRICATION	Oil Level		1			Blower Shutdown
	Oil Leakage			1		
	Viscosity	500				
	Oil Change-Initial	500				
	Oil Change-Normal	1000			6	
FILTER	Vacuum		1			<1 in Hg
	Clogging				2	
DRIVETRAIN	Wear	2000				Blower Shutdown
	Belt Tension	2000				
	Belt Change	15000			24	
RIGHT ANGLE GEARBOX	Oil Change-Initial	500				
	Oil Change-Normal	1000			6	
MOISTURE TRAP/ SECONDARY	Drain Fluid		1			

Oil Capacities and Recommendations

The initial oil change on the blower is after 500 hours of operation.



CHANGE OIL IN BOTH DRIVE AND NON-DRIVE OIL TANKS

Right Angle Gearbox Lubricant			
Size	Capacity (oz)	Manufacturer	Grade
500 Series	28	Summit	Summit Syngear SH-7220
600 Series	80-90	Mobil	Monilube SHC 75W-90

Size	Blower Oil Capacity - DO NOT OVERFILL		
	Drive Side Oz (Liters)	Non-Drive Side Oz (Liters)	Total
4307	18 (.53)	8 (.24)	26 (.77)
4310			

Recommended Oils for Blower (Synthetic Only)				
Ambient Temp °F (°C)	Type	Viscosity	Pour Point	Color
Above 90° F (32° C)	Summit Syngear SH-7320	ISO 320	-40 (-40)	Clear
	Mobile SHC 632		-40 (-40)	Orange
32° to 90° (0° to 32°)	Summit Syngear SH-7220	ISO 220	-45 (-43)	Clear
	Mobil SHC 630		-41 (-42)	Orange
0° to 32° (-18° to 0°)	Summit Syngear SH-7150	ISO 150	-60 (-51)	Clear
	Mobile SHC 629		-45 (-43)	Orange
Below 0° (-18°)	Summit Syngear SH-7100	ISO 100	-60 (-51)	Clear
	Mobil SHC 627		-45 (-43)	Orange

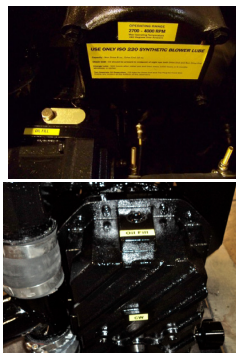
*Ambient temp is the temperature of the space where the blower is located or enclosed.



- Dispose of used oil according to local regulations
- Excessive or insufficient gear lube levels can cause catastrophic blower failure.

Change Gear Casing Lube; first 500 hours, then every 1,000 hours.

- There are three separate gear cases which must be serviced with new ISO 220 synthetic gear lube. Drive end blower. Non drive end blower. Right angle gearbox (for gearbox mount packages)
- Periodically check sight eyes for oil level. (Sight eyes located on right and left sides of the blower on the non drive end.)



Clean Out Procedure if Flooded

1. Remove the inlet filter, exhaust silencer and ballast silencer.
2. With high pressure water, clean intake, exhaust and ballast areas.
3. Have an assistant slowly turn the input shaft as you clean the lobes with water.
4. Run the blower at the lowest speed possible and continue to spray water into the inlet of the machine until the discharge shows only clean water.
5. With the blower running, spray a small amount of penetrating oil into the intake and run until no liquid comes out the exhaust. **DO NOT SPRAY OIL INTO THE BLOWER WITH THE SILENCERS IN PLACE.**
6. Disassemble and clean the manifold/4-way valve assembly. Allow to dry then reassemble.
7. If the blower was flooded, it is highly probable the exhaust silencer has material in it as well. Clean it out as best you can. Drain all fluids from the silencer and allow it to dry.
8. When everything is clean and dry, reassemble the manifold and silencers. Make sure flange bolts on the blower are tightened evenly.

Lubricant Schedule

Unlike a typical rotary vane vacuum pump, the Challenger Series 4307 and 4310 high vacuum blower does not use oil in it's operation. Therefore it is important to periodically lubricate the internal parts in the blower to keep it free of rust and corrosion, which can cause seizing or catastrophic failure. The time intervals between the various maintenance procedures depends greatly on such factors as: Type of product being pumped, actual pumping time, idle equipment (periods of non use), set up perimeters (rpm and working vacuum and pressure), and working climate and conditions. It is therefore up to the operator to adjust the following schedule accordingly.

Rebuilding

Rebuilding is beyond the scope of this owner's manual and should be performed only by trained technicians. Consult an authorized distributor or NVE to arrange rebuilding of the blower.

Main Pump Housing – Fluid flush; At least weekly.

- Your blower comes standard with flush fluid kit hookup capability. This is used to introduce small amounts of flushing fluid into the machine to clean out debris and inhibit rust. Note this procedure is also followed daily in cold climates to help keep any moisture that may be in the blower from freezing up.
- Make sure the reservoir contains flushing fuel.
- While the blower is running at it's lowest rpm setting with the vacuum/pressure change over valve in the neutral position, open the brass valve at the base of the fluid flush reservoir(4310) or directly under filter housing(4307) and close it after two seconds.
- In instances where there is significant water or product in the blower this process can be repeated as necessary. In that case the drains in the bottom of the silencers should be left open until the process is complete.



Vacuum/Pressure Changeover Valve; As needed.

- Remove screws which secure the bonnet or top to the valve body. Alternate screws as you loosen them to keep the spring evenly compressed.
- Pull up on the handle, removing the inner workings of the valve. Note the position of the handle in plug for later reinstallation.
- Generously lubricate the inside of the valve casing and the inner workings of the valve.
- Making sure the o-ring is in place on the top of the valve housing, replace the inner workings in the same position they were removed.
- Tighten the four fasteners in an alternate manner to maintain even pressure on the spring during compression.
- Work the valve handle back and forth several times to ensure free movement.

TROUBLESHOOTING

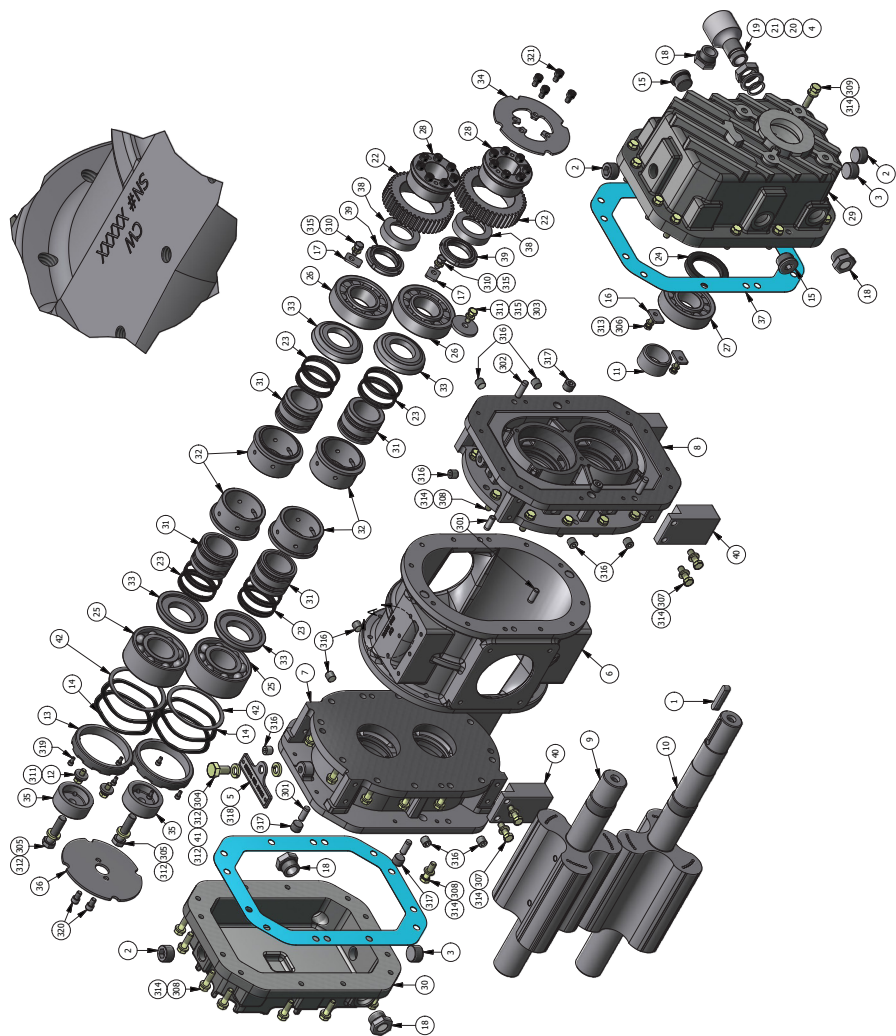
Operating Problem	Probable Cause (See Next Table)
Blower does not spin freely	A, B & C
Inlet vacuum is not what's expected	D, E, X, Y, Z, AA & BB
Outlet pressure is not what's expected STOP THE BLOWER TO PREVENT DAMAGE	E, F & H
Outlet temperature is not what's expected STOP THE BLOWER TO PREVENT DAMAGE	D, E, F, G, H, J & K
Prime mover (engine or motor) is laboring excessively when driving blower.	A, B, C, D, E, F, L, M & N
Oil or liquid leaking from blower	M, P, R, S & T
Oil temperature is high	D, E, F, H, K, U & V
Blower is creating unusual noises or vibrations STOP THE BLOWER TO PREVENT DAMAGE	A, B, C, D, F, G, H, K, L, N, W & AC

	Probable Cause	Remedy
A	Rotors are contacting each other	Stop the blower immediately and check the internal clearances of the blower
B	Deposit build up on cylinder wall	Clean the cylinder walls and rotors
C	Object was ingested into the blower	Remove the object, clean the internal walls of blower and check the internal clearances
D	Inlet plumbing or filter clogged	Check and clean the inlet plumbing and filter
E	Blower not at correct RPM	Verify blower RPM and adjust accordingly
F	Exhaust plumbing clogged	Clean exhaust plumbing and mufflers
G	Rotors are worn	Verify internal clearances and replace or rebuild blower as necessary
H	Ballast plumbing is clogged	Check and clean the ballast plumbing. If a ballast filter is installed, clean it also
J	Ballast air temperature out of specification	Verify ballast air temperature is within specification and adjust accordingly
K	Inlet temperature out of specification	Verify inlet temperature is within specification and adjust accordingly
L	Bearings worn	Have blower rebuilt
M	Oil level too high	Check required oil level in each tank and remove oil as necessary
N	Coupler or belts not aligned	Check the alignment
P	Oil tank gaskets worn	Replace oil tank gaskets
R	Drive shaft seal worn	Replace shaft seal for drive oil tank
S	Oil tank plugs or sight eyes fault	Replace the plugs or sight eyes Use thread sealer on NPT threads.
T	Blower operated at excessive angle	Verify blower is level during operation

U	Oil too thick	Use correct viscosity oil
V	Oil is foaming	Use correct type of oil
W	Operating Diesel engine at too low of an RPM causing rotor contact	Increase Engine RPM and adjust drive ratios according. Use a vibration dampened drive shaft
X	Moisture trap or shut off is full and closed off	Empty the moisture trap or shut off of fluid
Y	Plugged or collapsed hose (not always visible from outside of hose)	Unplug or replace hoses
Z	Vacuum Leaks in tank or fittings	Repair leaks
AA	Four way valve not fully seated in proper position	Seat the 4-way valve. Clean if debris built up has occurred
AB	Faulty relief valve	Replace relief valve
AC	Rotors timing is off	Have blower rebuilt

	Probable Cause	Remedy
A	Rotors are contacting each other	Stop the blower immediately and check the internal clearances of the blower
B	Deposit build up on cylinder wall	Clean the cylinder walls and rotors
C	Object was ingested into the blower	Remove the object, clean the internal walls of blower and check the internal clearances
D	Inlet plumbing or filter clogged	Check and clean the inlet plumbing and filter
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F	Exhaust plumbing clogged	Clean exhaust plumbing and mufflers
G	Rotors are worn	Verify internal clearances and replace or rebuild blower as necessary
H	Ballast plumbing is clogged	Check and clean the ballast plumbing If a ballast filter is installed, clean it also
J	Ballast air temperature out of specification	Verify ballast air temperature is within specification and adjust accordingly
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Z	Vacuum Leaks in tank or fittings	Repair leaks
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4307 Blower | Parts Diagram



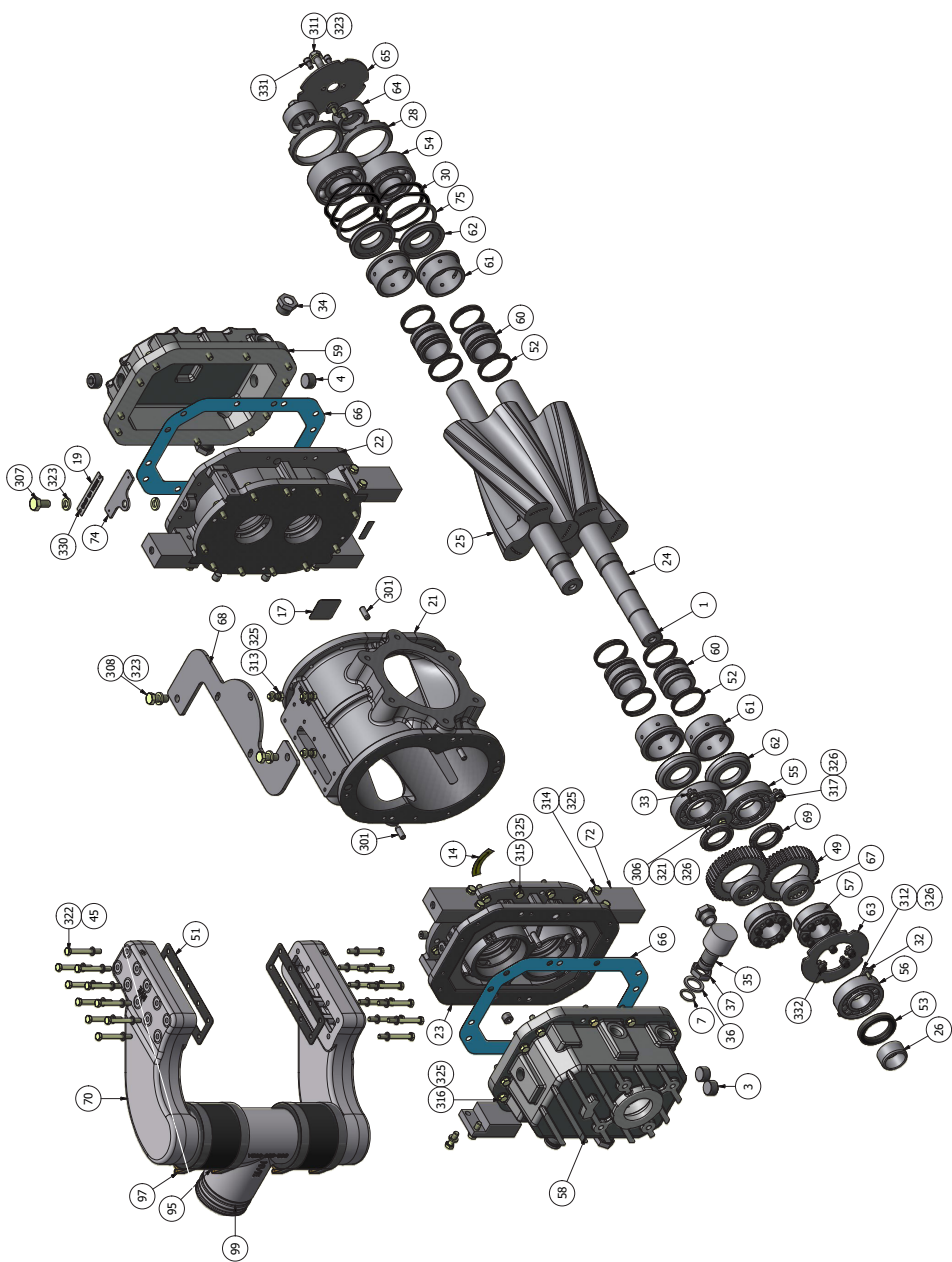
4307 Blower Complete | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	120-006	KEY 3/8" X 3/8" X 2"
2	3	120-047	DRAIN PLUG, 3/4" NPT
3	2	120-047-1	DRAIN PLUG, 3/4" NPT MAGNETIC
4	1	120-064-008	O-RING 3-912 VITON
5	1	120-107	TAG, SERIAL NUMBER, BRASS
6	1	150-001-4307	HOUSING MAIN 4307
7	1	150-003-4310-1	ENDPLATE, DRIVE 4310 MACH
8	1	150-003-4310-2	ENDPLATE, NONDRIVE 4310 MACH
9	1	150-005-4307-BI	ROTOR IDLER 4307 B-LOC
10	1	150-005-4307-D	ROTOR, DRIVE 4307
11	1	150-009-747	SEAL SLEEVE, OUTER
12	2	150-047-003	PLUG SAE ORB -12
13	2	150-047-4310	BEARING RETAINER, 4310
14	4	150-047-957	BEARING RETAINER, 957
15	4	150-048	SIGHT EYE, 1 1/16"-12 SAE
16	1	150-048-001-1	SIGHT EYE BODY, 90 DEG
17	1	150-048-001-2	WASHER, SIGHT EYE-ALUM
18	1	150-048-001-3	HEX NUT, 1 1/16"-12
19	2	150-612-747	TIMING GEAR, DRIVE, 747
20	16	150-618-747	SEAL RING, 2.5 OD CAST IRON
21	1	150-620-747	SEAL, 50 X 72 X 10 AS FMK
22	2	150-621-747	BEARING, 5309 (45 X 100 X 39.7)
23	2	150-622-747	BEARING, NU309 (45 X 100 X 25)
24	1	150-623-747	BEARING, NU308 (40 X 90 X 23)
25	2	150-624-747	B-LOC, RETAINING RING, FLANGED
26	1	150-627-747	END COVER, DRIVE END 4310
27	1	150-628-747	OIL COVER, NON-DRIVE 747/4310
28	4	150-629-4310	SEAL SLEEVE, ID 4310
29	4	150-630-747	SEAL SLEEVE, OD 4310/747
30	4	150-631-747	SLINGER, SHAFT GUARD, 747
31	1	150-635-747	OIL SLINGER, DRIVE END 747
32	1	150-636-747	RETAINER, NONDRIVE END, 747
33	1	150-637-747	OIL SLINGER, NON-DRIVE END 747
34	1	150-638-747	RETAINER, IDLER ROTOR 747
35	2	150-639-747	GASKET, END COVER 747
36	2	150-641-747	RETAINER, LOCKNUT 747
37	2	150-645-747	LOCK NUT DRIVE, ROTOR, 747
38	4	150-652-001	MOUNTING FOOT, 4310
301	4	DP - 3_8 X 1.00	DOWEL PIN - 3/8 X 1.00 LG
302	2	DP - 3_8 X 1.25	DOWELL PIN - 3/8 X 1.25 LG
303	2	FW - 3_8 X 1.75	WASHER, FENDER 3/8" x 1 3/4" X 3/16" THICK, PLATED

4307 Blower Complete | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
304	2	HHCS - 5/16-18 UNC x 0.75	HEX HEAD CAP SCREW - 5/16-18 UNC x 0.75
305	8	HHCS - 3_8-16 UNC X 1.125	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.125
306	36	HHCS - 3_8-16 UNC X 1.25	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.25
307	12	HHCS - 3_8-16 UNC X 1.50	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.50"
308	1	HHCS - 3_8-24 UNF X 1.25	HEX HEAD CAP SCREW - 3/8-24 UNF X 1.25
309	1	HHCS - 3_8-24 UNF X 1.75	HEX HEAD CAP SCREW - 3/8-24 UNF X 1.75
310	4	HHCS - 5_16-18 UNC X 0.625	HEX HEAD CAP SCREW - 5/16-18 UNC X 0.625
312	2	HHCS - 1_4-20 UNC X 0.75	HEX HEAD CAP SCREW - 1/4-20 UNC X 0.75
313	58	LW - 3_8	LOCK WASHER, 3/8"
314	6	LW - 5_16	LOCK WASHER, 5/16"
315	2	LW - 1_4	LOCK WASHER, 1/4"
316	4	PLUG - 3_8 NPT SH	SOCKET HEAD PLUG - 3/8 NPT
317	10	PLUG - 1_4 NPT SH	SOCKET HEAD PLUG - 1/4 NPT
318	2	SHCS - 5_16-18 UNC X 0.50	SHCS - 5/16-18 UNC X 0.50
319	4	SHCS - M8 X 12MM	SHCS - M8 X 12MM
320	1	HHCS - 1_2-13 UNC - 0.75	HEX HEAD CAP SCREW - 1/2-13 UNC - 0.75
321	1	LW - 1_2	LOCK WASHER, 1/2

4310 Blower | Parts Diagram



4310 Blower Complete | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	120-006	KEY 3/8" X 3/8" X 2"
2	1	120-010-001	CAP 3/4" PIPE BLACK POLY
3	2	120-047	DRAIN PLUG, 3/4" NPT
4	2	120-047-1	DRAIN PLUG, 3/4" NPT MAGNETIC
5	1	120-049-004	BUSHING BRASS 3/4" X 1/4"
6	1	120-064-003	O-RING, 2-240 VITON
7	1	120-064-008	O-RING 3-912 VITON
8	2	120-064-011	O-RING, 2-438 VITON
9	4	120-064-012	O-RING, 2-350 VITON
10	1	120-064-013	O-RING, 2-259 VITON
11	1	120-078-005	GROMMET 0.5 I.D. 0.8125 G.D. 0.25 G.W.
12	1	120-100-012	DECAL CLEAN FILTER REGULARY YELLOW
13	1	120-100-020	DECAL RPM 2700-4000
14	1	120-101-006	DECAL CURVED CW ARROW
15	1	120-101-007 (A)	DECAL OIL FILL
16	1	120-101-007 (B)	DECAL OIL VENT
17	1	120-101-010	DECAL 4310 BLOWER
18	1	120-103	VALVE, DRAIN 1/4" NPT
19	1	120-107-001	SERIAL TAG SS
20	4	120-312-002	KNOB, 5/16-18UNC
21	1	150-001-4310	HOUSING MAIN 4310
22	1	150-003-015	ENDPLATE NON-DRIVE 43 SERIES MACHINED
23	1	150-003-016	ENDPLATE DRIVE 43 SERIES MACHINED
24	1	150-005-4310-DR	ROTOR, DRIVE MACHINED LEFT HAND SCREW 4310 HELICAL
25	1	150-005-4310-IL	ROTOR, IDLER MACHINED LEFT HAND SCREW 4310 HELICAL
26	1	150-009-747	SEAL SLEEVE, OUTER
27	2	150-011-002	ROTOR ADJUSTMENT NUT LOCK WASHER
28	2	150-011-003	ROTOR ADJUSTMENT NUT 43 SERIES
29	1	150-041-007	CHECK VALVE FLAPPER, 4 IN SS
30	4	150-045-002	WAVE SPRING 43 SERIES
31	1	150-047-003	PLUG SAE ORB -12
32	2	150-047-4310	BEARING RETAINER, 4310
33	2	150-047-957	BEARING RETAINER, 957
34	4	150-048	SIGHT EYE, 1 1/16"-12 SAE
35	1	150-048-001-1	SIGHT EYE BODY, 90 DEG
36	1	150-048-001-2	WASHER, SIGHT EYE-ALUM
37	1	150-048-001-3	HEX NUT, 1 1/16"-12
38	2	150-063-001	ELBOW, ADJ 4" W/ 1/4 NPT
39	1	150-063-002	ELBOW, ADJ 6" TO 4" MACH
40	1	150-063-003	ELBOW, INTAKE 4310
41	1	150-063-004	FLANGE, CHECK 4" 4310

4310 Blower Complete | Parts List Continued

ITEM	QTY	PART NUMBER	DESCRIPTION
42	1	150-063-006	FLANGE, RETAINING 6" ADJ ELBOW
43	4	150-063-014	FLANGE, 4" ADJ-ELBOW NARROW
44	2	150-099-007	WASHER, #10 FLAT HD
45	20	150-099-008	WASHER, 5/16 SEALING BUNA
46	1	150-309-001	HOUSING, FILTER MACHINED 4310
47	1	150-310-002	COVER, FILTER 4310
48	1	150-314-002	FILTER, STAINLESS 4310
49	2	150-612-747	TIMING GEAR, DRIVE, 747
50	1	150-616-001	GASKET, 4" SQ INTAKE CHECK
51	2	150-616-4310	GASKET, BALLAST MANIFOLD, 4310
52	16	150-618-747	SEAL RING, 2.5 OD CAST IRON
53	1	150-620-747	SEAL, 50 X 72 X 10 AS FMK
54	2	150-621-747	BEARING, 5309 (45 X 100 X 39.7)
55	2	150-622-747	BEARING, NU309 (45 X 100 X 25)
56	1	150-623-747	BEARING, NU308 (40 X 90 X 23)
57	2	150-624-747	B-LOC, RETAINING RING, FLANGED
58	1	150-627-747	END COVER, DRIVE END 4310
59	1	150-628-004	END COVER NON-DRIVE END 43 SERIES
60	4	150-629-005	SEAL SLEEVE, ID 4310
61	4	150-630-002	SEAL SLEEVE, OD 43 SERIES
62	4	150-631-003	SEAL SLINGER 43 SERIES MACHINED
63	1	150-635-747	OIL SLINGER, DRIVE END 747
64	2	150-636-005	BEARING RETAINER ND, SLINGER MOUNT, 43 SERIES
65	1	150-637-001	OIL SLINGER, 43 SERIES, NON DRIVE END
66	2	150-639-747	GASKET, END COVER 747
67	2	150-641-747	RETAINER, LOCKNUT 747
68	1	150-644-010	
69	2	150-645-747	LOCK NUT DRIVE, ROTOR, 747
70	1	150-650-004	BALLAST MANIFOLD, LH 4310 MACH
71	1	150-650-005	BALLAST MANIFOLD, RH 4310 MACH
72	6	150-652-002	MOUNTING FOOT 43 SERIES
73	1	280-355-086	4310 LDM MAINTENANCE BRACKET
74	1	280-355-169	SERIAL TAG MOUNTING PLATE SS
75	2	280-355-209	43 SERIES WAVE SPRING BACKER
76	1	310-LP14	HOSE BARB 1/2" X 3/8" MNPT 90 DEG ELBOW
77	1	310-LP15	HOSE BARB 1/2" X 3/4" MNPT STRAIGHT
78	1	310-LP4	HOSE BARB 1/4" NPT X 1/4" 90 DEG ELBOW BRASS
79	2	310-LP6	HOSE BARB, 1/4 TO 1/4NPT STRT
80	1	320-407-003-3	OIL LINE BLK 1/4" ID 30R7 - 24 IN
81	1	320-407-016-7	FILL HOSE DRIVE END 30 IN
82	1	320-407-025	

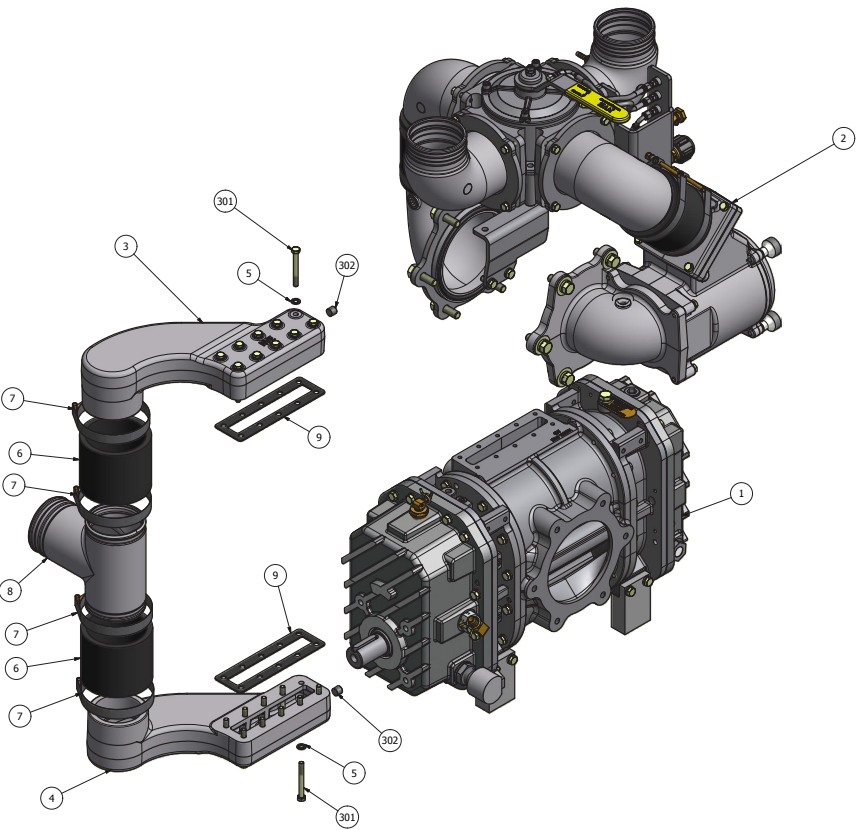
4310 Blower Complete | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
83	1	320-407-026	GREASE LINE -3 SST STR -3 FEMALE JIC TO STR -3 FEMALE JIC 4" (MAKE)
84	1	320-407-027	GREASE LINE -3 SST 90 DEG JIC TO 90 DEG JIC 6" (MAKE)
85	6	320-408-016	FITTING STR -3 MJIC X 1/8 MNPT
86	3	320-408-028	FITTING 1/4"-28 X1/8" FNPT STRAIGHT
87	3	320-408-029	FITTING GREASE 1/8" MNPT
88	1	320-408-030	FITTING 12 MORB X 3/8" FNPT STRAIGHT
89	1	320-409-011	CLIP 4300 SERIES REMOTE OIL FILL
90	2	320-409-012	SPRING CLIP CONSTANT-TENSION 3/4 OD HOSE
91	2	320-409-013	SPRING CLIP CONSTANT-TENSION 1/2 OD HOSE
92	1	410-004-002-4310	VALVE, 4" 4-WAY, ASSEMBLY NO FLANGES
93	1	412-102-251	O-RING, 2-251, FPM
94	1	426-400-TAR-0500	HOSE 4"D X 5"L
95	2	426-400-TAR-4IN	HOSE, 4", TAR & ASPHALT-4 IN LG
96	1	426-400-TAR-4_5IN	HOSE, 4", TAR & ASPHALT-4_5 IN LG
97	8	426-4625-TBC	CLAMP, T-BOLT, 4.625"
98	2	802-063-001	ELBOW, 4" 90 DEG ALUM
99	1	802-650-003A	BALLAST TEE, 4310 CAST
301	4	DP - 3/8 X 1.00	DOWEL PIN - 3/8 X 1.00 LG
302	2	DP - 3/8 X 1.25	DOWELL PIN - 3/8 X 1.25 LG
303	2	FSCS - 10-24 UNC X 0.50	FLAT SOCKET CAP SCREW - 10-24 UNC X 0.50
304	1	FSCS - 1_2-13 UNC X 1.25	FLAT SOCKET CAP SCREW - 1_2-13 UNC X 1.25 ZINC
305	11	FW - 1/2	FLAT WASHER, 1/2
306	1	FW - 3/8 X 1.75	WASHER, FENDER 3/8" x 1 3/4" X 3/16" THICK, PLATED
307	1	HHCS - 1/2-13 UNC X 1.00	HEX HEAD CAP SCREW - 1/2-13 UNC X 1.00
308	2	HHCS - 1/2-13 UNC X 1.25	HEX HEAD CAP SCREW - 1/2-13 UNC X 1.25
309	5	HHCS - 1/2-13 UNC X 1.50	HEX HEAD CAP SCREW - 1/2-13 UNC X 1.50
310	6	HHCS - 1/2-13 UNC X 2.00	HEX HEAD CAP SCREW - 1/2-13 UNC X 2.00
311	2	HHCS - 1/2-20 UNF X 2.00	HEX HEAD CAP SCREW - 1/2-20 UNF X 2.00
312	2	HHCS - 1/4-20 UNC X 0.75	HEX HEAD CAP SCREW - 1/4-20 UNC X 0.75
313	3	HHCS - 3/8-16 UNC X 0.75	HEX HEAD CAP SCREW - 3/8-16 UNC X 0.75
314	12	HHCS - 3/8-16 UNC X 1.125	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.125
315	36	HHCS - 3/8-16 UNC X 1.25	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.25
316	12	HHCS - 3/8-16 UNC X 1.50	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.50
317	2	HHCS - 5/16-18 UNC X 0.625	HEX HEAD CAP SCREW - 5/16-18 UNC X 0.625
318	14	HHCS - 5/16-18 UNC X 1.25	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.25
319	6	HHCS - 5/16-18 UNC X 1.50	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.50
320	4	HHCS - 5/16-18 UNC X 1.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.75
321	3	HHCS - 5/16-18 UNC x 0.75	HEX HEAD CAP SCREW - 5/16-18 UNC x 0.75
322	20	HHCS - 5_16-18 UNC X 2.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 2.75
323	17	LW - 1/2	LOCK WASHER, 1/2
324	2	LW - 1/4	LOCK WASHER, 1/4

4310 Blower Complete | Parts List Continued

ITEM	QTY	PART NUMBER	DESCRIPTION
325	63	LW - 3/8	LOCK WASHER, 3/8
326	31	LW - 5/16	LOCK WASHER, 5/16
327	18	PLUG - 1/4 NPT SH	SOCKET HEAD PLUG - 1/4 NPT
328	1	PLUG - 1_2 NPT SH	SOCKET HEAD PLUG - 1_2 NPT
329	4	PLUG - 3/8 NPT SH	SOCKET HEAD PLUG - 3/8 NPT
330	2	RVT 3/32 D X 1/4L SS	BLIND RIVET, 3/32 DIA X 1/4 GRIP, SS
331	2	SHCS - 5/16-18 UNC X 0.50	SOCKET HEAD CAP SCREW - 5/16-18 UNC X 0.50
332	4	SHCS - M8 X 12MM	SOCKET HEAD CAP SCREW - M8 X 12MM
333	4	SS - 5/16-18 UNC X 1.75	HEXAGON SOCKET SET SCREW - 5/16-18 UNC X 1.75 SS

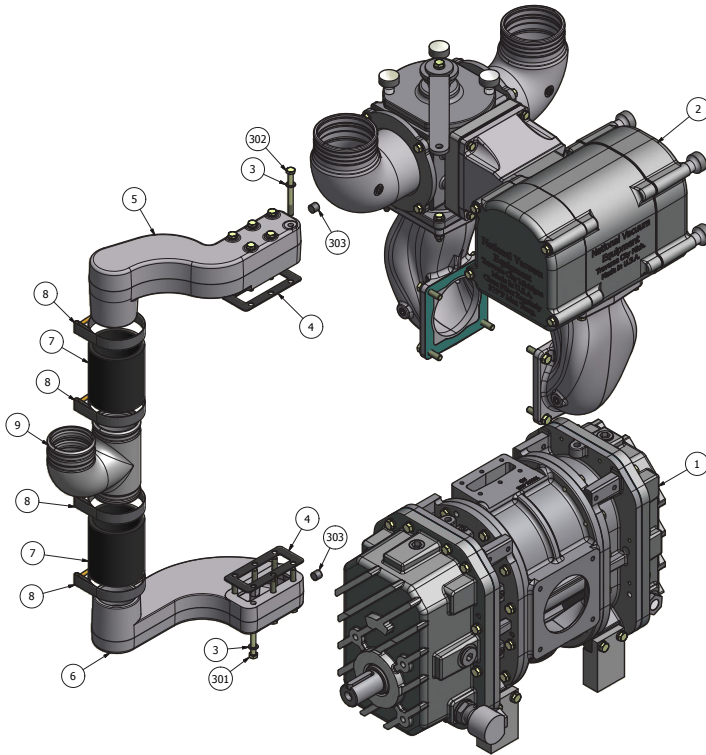
4310 Blower 4-Way Intake Manifold | Parts Diagram



4310 Blower 4-Way Intake Manifold | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	131-4310-LD	BLOWER, 4310 CW
2	1	148-4310-002	MANIFOLD, CW CAST AL 4310
3	1	150-650-004	BALLAST MANIFOLD, LH 4310 MACH
4	1	150-650-005	BALLAST MANIFOLD, RH 4310 MACH
5	1	150-099-008	WASHER, 5/16 SEALING BUNA
6	2	426-400-TAR-0400	HOSE, 4", TAR & ASPHALT - 4 IN LG
7	4	426-4625-TBC	CLAMP, T-BOLT, 4.625"
8	1	802-650-003A	BALLAST TEE 4310 BALLAST MANIFOLD
9	2	150-616-4310	GASKET, BALLAST MANIFOLD, 4310
301	12	HHCS - 5/16-18 UNC X 2.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 2.75

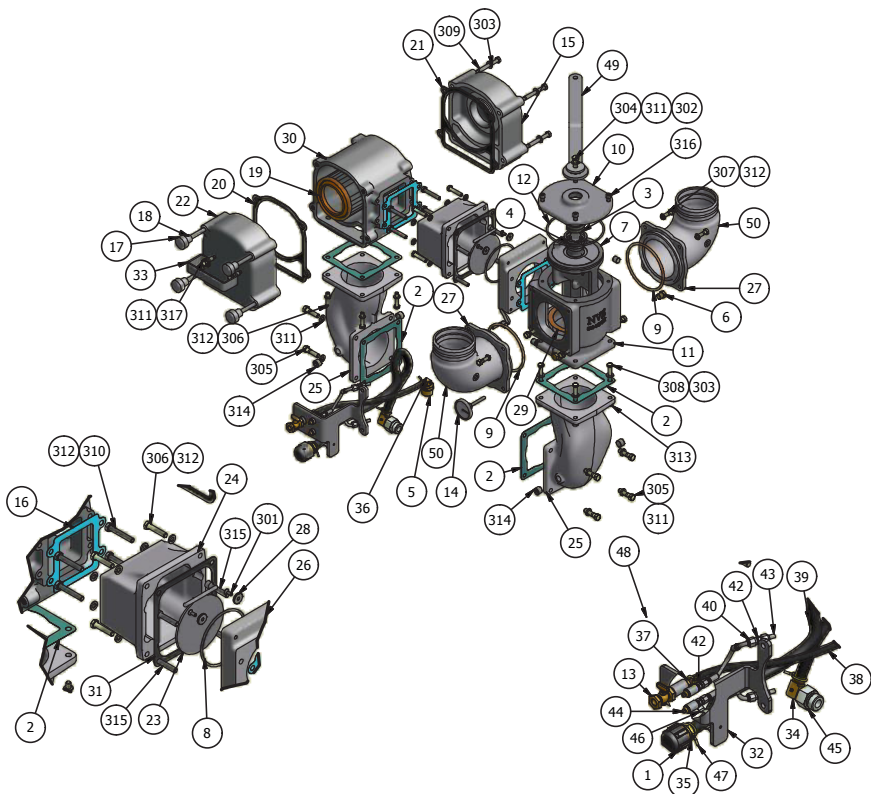
4307 Blower 4-Way Intake Manifold | Parts Diagram



4307 Blower 4-Way Intake Manifold | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	131-4307-LD	BLOWER, 4307 CW LOW SHAFT
2	1	148-4307-002	MANIFOLD, CW CAST AL 4307
3	12	150-099-008	WASHER, 5/16 SEALING BUNA
4	2	150-616-4307	GASKET, BALLAST MANIFOLD, 4307
5	1	150-650-006	BALLAST MANIFOLD, LH 4307 MACH
6	1	150-650-007	BALLAST MANIFOLD, RH 4307 MACH
7	2	426-300-TAR-4	HOSE, 3", TAR & ASPHALT-4 IN LG
8	4	426-3875-TBC	CLAMP, T-BOLT 3.875"
9	1	803-650-009	E-COAT BALLAST TEE W/ RISER, 4307 CAST
301	6	HHCS - 5/16-18 UNC X 3	HEX HEAD CAP SCREW - 5/16-18 UNC X 3
302	6	HHCS - 5/16-18 UNC X 3.25	HEX HEAD CAP SCREW - 5/16-18 UNC X 3.25
303	2	PLUG - 1/4 NPT SH	SOCKET HEAD PLUG - 1/4 NPT

4307 Blower 4-Way Manifold | Parts Diagram



4307 Blower 4-Way Manifold | Parts List

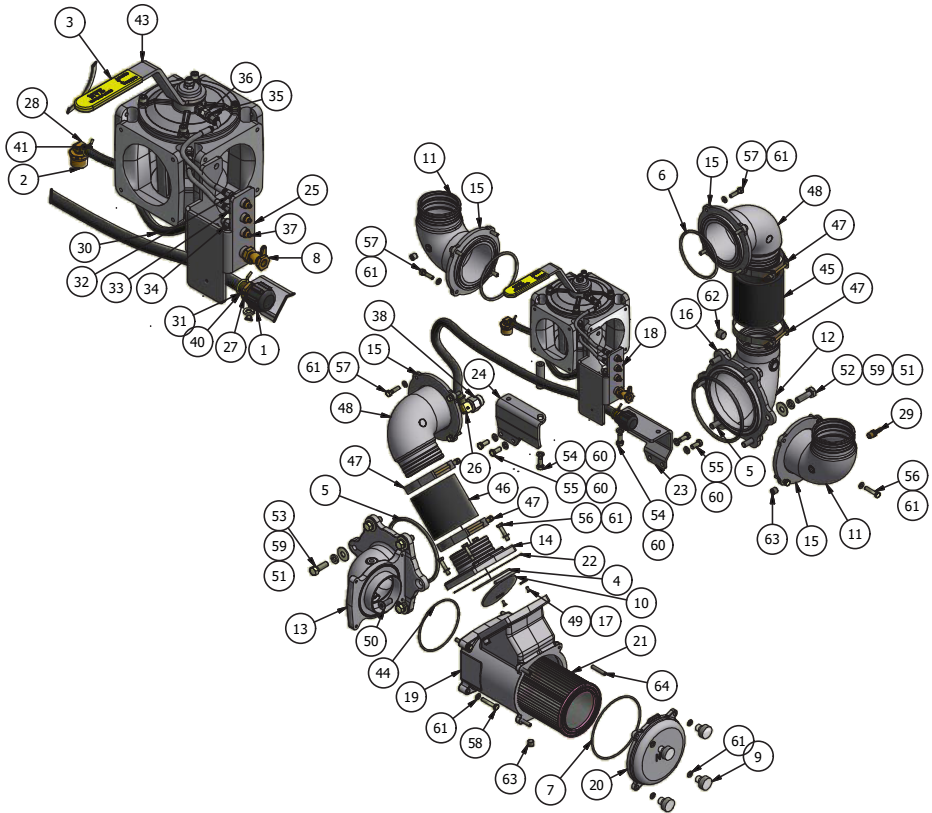
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	120-010-001	CAP 3/4" PIPE BLACK POLY
2	4	120-039-506	GASKET, 4" INT/EXH FLANGE
3	2	120-040	4-WAY VALVE SEAL 3" & 4" VITON
4	1	120-045	SPRING 4-WAY FTR VALVE
5	1	120-049-004	BUSHING BRASS 3/4" X 1/4"
6	2	120-059	PLUG BRASS HEX HEAD 1/4" NPT
7	1	120-062-367	PLUG, 4-WAY W/ FILTER
8	1	120-064-003	O-RING, 2-240 VITON
9	2	120-064-012	O-RING, 2-350 VITON
10	1	120-065	TOWER, 4-WAY W/ FILTER
11	1	120-067-506	4-WAY HOUSING, 4" W/ FILTER
12	1	120-068	ORING, 2-252 VITON
13	1	120-103	VALVE, DRAIN 1/4" NPT
14	1	120-220	THERMOMETER, 50- 400 DEG, 2" FACE
15	1	120-310	FILTER COVER

4307 Blower 4-Way Manifold | Parts List Continued

ITEM	QTY	PART NUMBER	DESCRIPTION
16	2	120-311	GASKET, FILTER HOUSING, 4-WAY
17	4	120-312	KNOB, 3/8-16 UNC
18	4	120-313	STUD, 3/8-16UNC-2A x 4-3/8" SS
19	1	120-314	FILTER ELEMENT, INLET 367/506
20	1	120-315	GASKET COVER FLTR 4-WAY
21	1	120-315-B	GASKET COVER FLTR 4-WAY, BUNA
22	1	120-317	FILTER COVER
23	1	150-041-007	CHECK VALVE FLAPPER, 4 IN SS
24	1	150-041-008	CHECK VALVE HOUSING 4307
25	2	150-063-008	ELBOW MANIFOLD 4307 MACH
26	1	150-063-009	CHECK VALVE FLANGE MANIFOLD 4307 MACH
27	2	150-063-014	FLANGE, 4" ADJ-ELBOW NARROW
28	2	150-099-007	WASHER, #10 FLAT HD
29	1	150-099-010	WASHER, THRUST BRONZE, 5.25" OD .06"
30	1	150-309-4307	FILTER HOUSING, 4"
31	1	150-616-002	GASKET, 4" SQ INTAKE CHECK
32	1	280-355-078	4307 MAINTENANCE BRACKET
33	1	280-355-079	4307 FILTER COVER HANDLE
34	1	310-LP14	HOSE BARB 1/2" X 3/8" MNPT 90 DEG ELBOW
35	1	310-LP15	HOSE BARB 1/2" X 3/4" MNPT STRAIGHT
36	1	310-LP4	HOSE BARB 1/4" NPT X 1/4" 90 DEG ELBOW BRASS
37	1	310-LP6	HOSE BARB, 1/4 TO 1/4NPT STRT
38	1	320-407-003	OIL LINE BLK 1/4" ID 30R7 - 24 IN
39	1	320-407-016	FILL HOSE DRIVE END 30 IN
40	1	320-407-024	GREASE LINE -3 SST 90 DEG JIC TO STR -3 FEMALE JIC 6" (MAKE)
41	1	320-407-024-2	GREASE LINE -3 SST 90 DEG JIC TO STR -3 FEMALE JIC 6" (MAKE)
42	4	320-408-016	FITTING STR -3 MJIC X 1/8 MNPT
43	2	320-408-028	FITTING 1/4"-28 X1/8" FNPT STRAIGHT
44	2	320-408-029	FITTING GREASE 1/8" MNPT
45	1	320-408-030	FITTING 12 MORB X 3/8" FNPT STRAIGHT
46	1	320-409-011	CLIP 4300 SERIES REMOTE OIL FILL
47	2	320-409-012	SPRING CLIP CONSTANT-TENSION 3/4 OD HOSE
48	2	320-409-013	SPRING CLIP CONSTANT-TENSION 1/2 OD HOSE
49	1	412-060-010	HANDLE 4307 ENCLOSED
50	2	150-063-001	ELBOW, ADJ 4" W/ 1/4 NPT
301	2	FSCS - 10-24 UNC X 0.50	FLAT SOCKET CAP SCREW - 10-24 UNC X 0.50
302	1	FW - 3_8 X 1.75	WASHER, FENDER 3/8" x 1 3/4" X 3/16" THICK, PLATED
303	8	FW - 5_16 SAE	FLAT WASHER, 5/16 SAE
304	1	HHCS - 3_8-16 UNC X 1.25	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.25
305	8	HHCS - 3_8-16 UNC X 1.50	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.50"

ITEM	QTY	PART NUMBER	DESCRIPTION
306	8	HHCS - 5_16-18 UNC - 1.50	HEX HEAD CAP SCREW - 5/16-18 UNC - 1.50
307	8	HHCS - 5_16-18 UNC X 1.25	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.25
308	4	HHCS - 5_16-18 UNC X 1.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.75
309	4	HHCS - 5_16-18 UNC X 3.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 3.75
310	4	HHCS - 5_16-18 UNC x 2.25	HEX HEAD CAP SCREW - 5/16-18 UNC x 2.25 FULL THREAD
311	11	LW - 3_8	LOCK WASHER, 3/8"
312	20	LW - 5_16	LOCK WASHER, 5/16"
313	4	NYLOCK NUT - 5_16 UNC	NYLOCK NUT - 5_16 UNC
314	4	PLUG - 3_8 NPT SH	SOCKET HEAD PLUG - 3/8 NPT
315	4	SHCS - 5_16-18 UNC X 1.50	SHCS - 5/16-18 UNC X 1.50
316	4	SHCS - 5_16-18 UNC X 0.875	SHCS - 5/16-18 UNC X 0.875
317	2	HHCS - 3_8-16 UNC X 1.00	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.00
319	3	PLUG - 1_4 NPT SH	SOCKET HEAD PLUG - 1/4 NPT

4310 Blower 4-Way Intake Manifold | Parts Diagram



4310 Blower 4-Way Intake Manifold | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	120-010-001	CAP 3/4" PIPE BLACK POLY
2	1	120-049-004	BUSHING BRASS 3/4" X 1/4"
3	1	120-060-002	GRIP, HANDLE W/ LOGO
4	1	120-064-003	O-RING, 2-240 VITON
5	2	120-064-011	O-RING, 2-438 VITON
6	4	120-064-012	O-RING, 2-350 VITON
7	1	120-064-013	O-RING, 2-259 VITON
8	1	120-103	VALVE, DRAIN 1/4" NPT
9	4	120-312-002	KNOB, 5/16-18UNC
10	1	150-041-007	CHECK VALVE FLAPPER, 4 IN SS
11	2	150-063-001	ELBOW, ADJ 4" W/ 1/4 NPT
12	1	150-063-002	ELBOW, ADJ 6" TO 4" MACH

4310 Blower 4-Way Intake Manifold | Parts List Continued

ITEM	QTY	PART NUMBER	DESCRIPTION
13	1	150-063-003	ELBOW, INTAKE 4310
14	1	150-063-004	FLANGE, CHECK 4" 4310
15	4	150-063-005	FLANGE, 4" ADJ-ELBOW
16	1	150-063-006	FLANGE, RETAINING 6" ADJ ELBOW
17	2	150-099-007	WASHER, #10 FLAT HD
18	2	150-122-001	STANDOFF, 3/8 UNC X 2.6"L STL
19	1	150-309-001	HOUSING, FILTER MACHINED 4310
20	1	150-310-002	COVER, FILTER 4310
21	1	150-314-002	FILTER, STAINLESS 4310
22	1	150-616-001	GASKET, 4" SQ INTAKE CHECK
23	1	150-644-001 150-644-003	BRACKET, CW 4-WAY 4310 EXH BRACKET, CCW 4-WAY 4310 EXH
24	1	150-644-002 150-644-004	BRACKET, CW 4-WAY 4310 INT BRACKET, CCW 4-WAY 4310 INT
25	1	280-355-086	4310 LDM MAINTENANCE BRACKET
26	1	310-LP14	HOSE BARB 1/2" X 3/8" MNPT 90 DEG ELBOW
27	1	310-LP15	HOSE BARB 1/2" X 3/4" MNPT STRAIGHT
28	1	310-LP4	HOSE BARB 1/4" NPT X 1/4" 90 DEG ELBOW BRASS
29	2	310-LP6	HOSE BARB, 1/4 TO 1/4NPT STRT
30	1	320-407-003-3	OIL LINE BLK 1/4" ID 30R7 - 24 IN
31	1	320-407-016-7	FILL HOSE DRIVE END 30 IN
32	1	320-407-025	GREASE LINE -3 SST 90 DEG JIC TO STR -3 FEMALE JIC 5.5" (MAKE)
33	1	320-407-026	GREASE LINE -3 SST STR -3 FEMALE JIC TO STR -3 FEMALE JIC 4" (MAKE)
34	1	320-407-027	GREASE LINE -3 SST 90 DEG JIC TO 90 DEG JIC 6" (MAKE)
35	6	320-408-016	FITTING STR -3 MJIC X 1/8 MNPT
36	3	320-408-028	FITTING 1/4"-28 X1/8" FNPT STRAIGHT
37	3	320-408-029	FITTING GREASE 1/8" MNPT
38	1	320-408-030	FITTING 12 MORB X 3/8" FNPT STRAIGHT
39	1	320-409-011	CLIP 4300 SERIES REMOTE OIL FILL
40	2	320-409-012	SPRING CLIP CONSTANT-TENSION 3/4 OD HOSE
41	2	320-409-013	SPRING CLIP CONSTANT-TENSION 1/2 OD HOSE
42	1	410-004-002-NF	VALVE, 4" 4-WAY, ASSEMBLY NO FLANGES
43	1	412-060-009	HANDLE 4310 ENCLOSED
44	1	412-102-251	O-RING, 2-251, FPM
45	1	426-400-TAR-0500	HOSE 4"D X 5"L
46	1	426-400-TAR-4_5IN	HOSE, 4", TAR & ASPHALT-4_5 IN LG
47	4	426-4625-TBC	CLAMP, T-BOLT, 4.625"
48	2	802-063-001	ELBOW, 4" 90 DEG ALUM
49	2	FSCS - 10-24 UNC X 0.50	FLAT SOCKET CAP SCREW - 10-24 UNC X 0.50
50	1	FSCS - 1_2-13 UNC X 1.25	FLAT SOCKET CAP SCREW - 1_2-13 UNC X 1.25 ZINC

4310 Blower 4-Way Intake Manifold | Parts List Continued

ITEM	QTY	PART NUMBER	DESCRIPTION
51	11	FW 1_2 USS	FLAT WASHER 1/2" USS
52	6	HHCS - 1_2-13 UNC - 1.75	HHCS - 1_2-13 UNC - 1.75
53	5	HHCS - 1_2-13 X 1.50	HHCS - 1_2-13 X 1.50
54	2	HHCS - 3_8-16 UNC X 0.75	HHCS - 3_8-16 UNC X 0.75
55	4	HHCS - 3_8-16 UNC X 0.875	HHCS - 3_8-16 UNC X 0.875
56	6	HHCS - 5_16-18 UNC - 1.50	HHCS - 5_16-18 UNC - 1.50
57	16	HHCS - 5_16-18 UNC X 1.25	HHCS - 5_16-18 UNC X 1.25
58	4	HHCS - 5_16-18 UNC X 1.75	HHCS - 5_16-18 UNC X 1.75
59	11	LW - 1_2	LW - 1_2
60	6	LW - 3_8	LW - 3_8
61	30	LW - 5_16	LW - 5_16
62	1	PLUG - 1_2 NPT SH	PLUG - 1_2 NPT SH
63	4	PLUG - 1_4 NPT SH	PLUG - 1_4 NPT SH
64	4	SS - 5_16-18 UNC X 1.75	SS - 5_16-18 UNC X 1.75



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