

The logo graphic consists of three stylized, overlapping shapes that resemble flames or a stylized 'V'. The top shape is blue, the middle is white, and the bottom is grey. They are arranged in a way that they appear to flow from left to right.

Vorstrom

Operator's Manual – Combo Unit

Sniffers Plant Hire VSO-1540



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CAUTION

Do not operate this equipment until all manuals have been read and are fully understood by management, maintenance workers and operators.

This piece of equipment is new will need to be checked over after the first two (2) hours of operation. The following checks will need to be completed;

- i. Fluid levels,
- ii. All fasteners including bolts, nuts and rivets,
- iii. Hydraulic fittings are tight and,
- iv. Couplings between pumps and hydraulic drives are tight and in correct position.

If there is any concern following these checks, please contact VitalQuip and ask for technical support to help you rectify any preliminary issues.

USING THIS MANUAL

This manual covers various different liquid vacuum equipment products. Therefore, some of the information given in this manual will not be relevant to your vacuum tank configuration.

All information and specifications in this manual are correct at the time of printing. However, because of Vorstrom's policy of continual product improvement, we reserve the right to make changes at any time without notice. These changes will be communicated to the customer as soon as reasonably practical.

GENERAL EQUIPMENT DESCRIPTION

This manual covers Vorstrom's Liquid Vacuum Equipment product range. The Liquid Vacuum product is a liquid tank, fitted to truck by;

- a) Rigid mounting,
- b) Trailer mounting,
- c) Hooklift mounting.

A vacuum pump is fitted to the tank to produce suction and is driven either by;

- a) Auxiliary engine,
- b) Hydraulic motor (PTO or auxiliary engine),
- c) Driveshaft driven from the truck's drive system.

SYSTEM OPERATION PARAMETERS

A vacuum truck is designed to pump liquid, semi liquid and sludge waste products. In order for this unit to do this productively and effectively, the owner/operator needs to fully understand what the pump and tank combination will & won't do.

Prior to starting the pump, it is advisable to do the following:

- Ensure the loading hoses are in position and the product that is to be pumped, ready & pumpable. (If it is too thick, it may need to be watered down)
- Make sure the hose is not in a position where it can suck itself to the bottom or side of the pit/tank. Ensure the hose has the end free at all times allow unhindered pumping.

Start the pump as outlined elsewhere and commence the loading operations. Once completed, close all inlet valves and immediately switch off the vacuum pump.



When emptying the load, it is advisable to release the vacuum either through the secondary shut off drain valve or at the pump valve. Stand clear and open the dump valve.

PTO ENGAGEMENT



This section details the operation of engaging and disengaging the PTO.

The Power Take Off (PTO) is generally a transmission mounted separate gearbox that is capable of transferring power from the truck's transmission into a usable form of power to do something other than drive the truck's wheels. The PTO is generally controlled from a dash mounted switch. It will be clearly marked by either an OEM symbol or a label.

Split Shaft Power Take-Offs are ultra-heavy duty PTOs used when auxiliary power requirements exceed the capacity of transmission mounted PTOs or where additional PTO outputs are required

Split shafts are designed to use the main vehicle driveshaft as their input and provide multiple outputs for auxiliary power equipment. Split Shaft PTOs are typically used for stationary applications. When engaged, the main drive shaft is disconnected from the rear axle.

Complete the following steps with engine running.

To Engage PTO:

1. To engage PTO depress clutch pedal all the way to the floor and hold ensuring transmission has stopped spinning
2. Flip up Red safety cover and flip up the toggle switch located on the left hand side of the dash and the Auxiliary PTO switch
3. Select 5th gear high split with gear shift
4. Slowly release clutch pedal (Ensure vehicle remains Stationary)
5. PTO should be running

Your unit is now ready to operate.

To Disengage PTO (Ensure all Vacuum pump controls are switched off):



1. Depress Clutch pedal all the way to the floor and hold
2. Move Gear shift to Neutral position
3. Flip Down red safety cover and disengage Auxiliary PTO
4. Release clutch pedal

Your Truck is now ready to drive.

Please note that failure to engage and disengage the PTO following the correct steps will void warranty.

VACUUM PUMP CONTROLS

This section details the use of the vacuum pump controls.

Once the PTO is engaged the RPM will jump up to its pre-set level



This section details the use of the vacuum pump controls and operation.

Once you have the PTO engaged and the correct RPM is reached you can now operate the vacuum pump by following these steps:

1. Ensure Four way valve is in desire position for the operation (Pressure or Vacuum)
2. Check all Valves and hoses are attached and in correct position
3. Press vacuum Pump On/Off Button (Pump should start to spin)

Your vacuum pump will now be operational. To shut down Vacuum pump please reverse the Start up procedure.

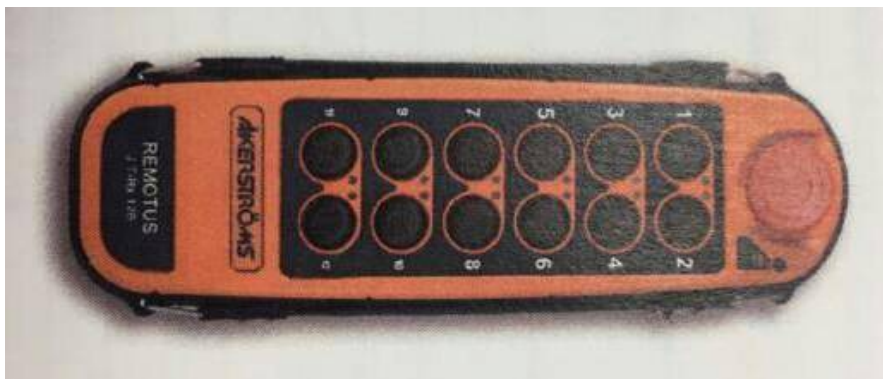




Ensure all relevant operational checks; JSA and Risk Analyses are carried out prior to commencing any pumping operation.

Overhead Suction Boom.

The overhead suction boom has 2 sets of controls 1: Mobile Pendant Controller, & 2: Remote Control. The purpose of these 2 separate sets of controls is to 1, move the boom from its transport position for tipping and operation and 2 operate the boom close to the vacuum/digging operation.



The boom operates with Hydraulic pressure generated from the Axillary PTO.

Steps to operate the Suction Boom:

1. Ensure Axillary PTO is engaged
2. Ensure the left hand side of the truck is free from obstacles by at least 6m
3. Engage the boom function in control panel
4. Turn on remote controller
5. Swing boom to the left until it is free from the vehicle



6. Boom can now be operated from the remote or pendant and vacuum/digging operation can begin

Steps to replace Boom in Transport Position:

1. Using the remote or pendant controller swing boom to the left side of the truck
2. Raise boom until it is higher than its holder and the hose will clear its holder.
3. Swing boom over the holder (when in position the boom will stop automatically)
4. Lower Boom ensuring hose does not foul, until it is resting in position on the holder.
5. Sequence is complete. ALWAYS DISENGAGE PTO BEFORE MOVING OFF

Pressure Cleaner and Water Supply.

This unit is equipped with a hydraulically driven pressure cleaner and 1200L Water tank.

The pressure cleaner has a retractable hose reel located at the on the Right hand side of the unit. There is a hand wand supplied with the unit.

Procedure to operate the pressure cleaner:

1. Select desired nozzle, connect to hose. (Always ensure the quick release couplings are engaged correctly before starting pressure cleaner.)
2. Ensure the water tank has adequate water for the operation.
3. Check valve for the water supply to the pressure cleaner is on and there are no water leaks.
4. Press Pressure Cleaner On/Off button located in the control box
5. Operate wand and commence operation.
6. Always shut off pressure cleaner before removing a wand from the hose or a nozzle from the wand. (NEVER DO THIS WITH THE PRESSURE CLEANER RUNNING)
7. Do not run the pressure cleaner without water and if tank empties shut off pressure cleaner immediately.

The fill point for the water tank is mounted on the left side behind the cab and the water level indicator is located behind the control box.



FILL POINT

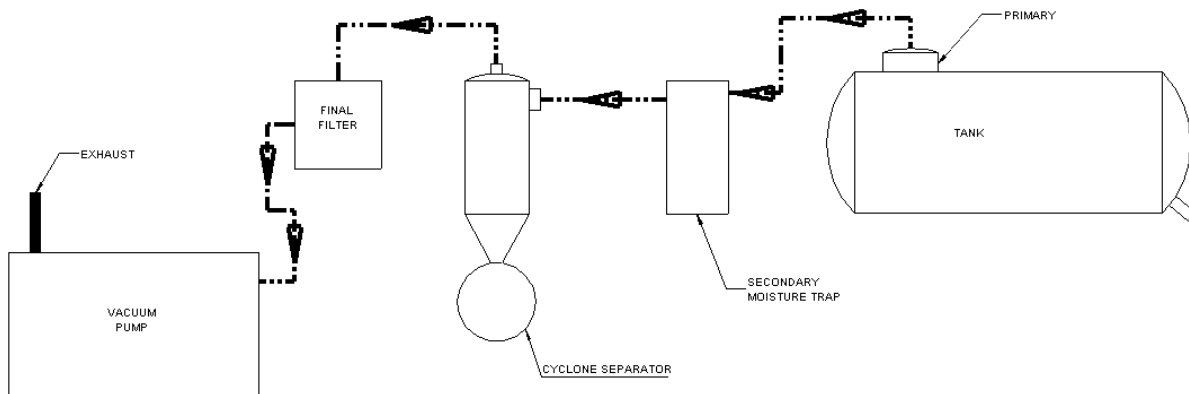


The pressure cleaner has a retractable hose reel located on the left hand side of the unit. There is a hand piece and turbo head nozzle supplied with the unit.

AIR FLOW SCHEMATICS

Air flow is the path the air travels in either the vacuum or pressure mode. The air flow is generated by the vacuum pump and is usually set to vacuum. If pressure is required the pump has a valve on the top of it which is capable of changing the airflow.

Following are the airflow schematics.



PRIMARY SHUT OFF (PSO)

The primary shut off (PSO) is the first mechanical shut off to prevent liquid from the tank entering the pump.

The primary shut off works by a float ball sealing on a rubber seat when the level of product in the tank reaches the ball. This pushes the float ball up, until the suction lifts the ball, holding it firmly against the rubber seal.

The float ball should be checked monthly, to ensure that there is no product build up that will inhibit the air flow seal.

Clean the ball with a solvent cleaner and check for any dents. Replace if necessary. Check the rubber seat for any signs of deterioration and replace if necessary.

TO REMOVE / REFIT THE PSO LID

1. Remove all vacuum / pressure from the tank.
2. Undo the wingnuts and lift open the hatch.
3. Refit the lid and replace the eye bolt, ensuring that plenty of anti-seize is applied to the eyebolt thread area where the wingnut will tighten on the thread.
4. Ensure the manway lid is centrally located over the neck, prior to tightening the wingnut.
5. Tighten the wingnut by hand, never use a wrench.
6. Start the vacuum pump in vacuum mode for 3 minutes
7. Re-tighten wingnut by hand
8. Closing sequence is complete



SECONDARY SHUT OFF (SSO)



The secondary shut off (SSO) is additional protection against product contamination and debris entering the vacuum pump.

This will catch any bypass from the primary shutoff which will occur over day to day usage, and should be drained every day.

The shut off works on the same principle as the Primary Shutoff, when the product level within the tank reaches such a level that float ball is pulled up to the seat by the pump's suction.

Check the ball for any product build up that will accumulate over time. It is recommended that the secondary shut off ball be checked monthly.

Clean the ball with a solvent cleaner and check for any dents. Replace if necessary. Check the rubber seat for any signs of deterioration, replace if necessary.

TO REMOVE / REFIT THE SSO LID

1. Release any pressure / vacuum out of the tank.
2. Undo the wingnuts and lift open the lid.
3. Refit the lid and replace the eye bolt, ensuring that plenty of anti-seize is applied to the bolt thread area where the wingnut will interact with the thread.
4. Ensure the manway lid is centrally located over the neck, prior to tightening the wingnuts.
5. Tighten the wingnuts by hand, never use a wrench.
6. Start the vacuum pump in vacuum mode for 3 minutes



7. Re-tighten wingnuts by hand
8. Closing sequence is complete

FINAL FILTER FOR ROTARY LOBE BLOWERS:

The final filter is usually fitted in conjunction with blower type vacuum pumps.

The purpose of the final filter is to remove any airborne particles from the airflow prior to the air entering the vacuum pump.



It is essential that the filter is cleaned on a regular basis. The following steps outline the process to be followed. If the filter is not cleaned on a regular basis, the airflow will be reduced and the pump will overheat and loss of vacuum will result. Ensure you wear PPE when carrying out all tasks described in this manual.

1. Ensure the vacuum tank is neutral
2. Loosen and remove the wingnuts holding the lid on.
3. Now you will see the filter element.
4. Clean the element by submerging it in diesel for a few minutes, remove the element and then using compressed air; blowing from the inside out to remove any trapped contamination.
5. Refit element.
6. Refit lid, ensuring it is central and using anti-seize on threads.

VACUUM RELIEF VALVE AND PRESSURE RELIEF VALVE

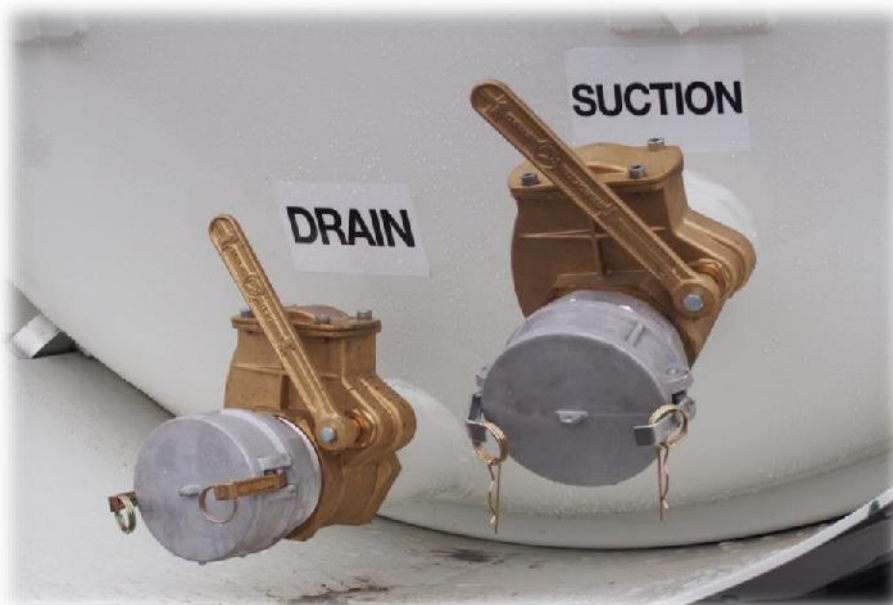




The purpose of a vacuum relief valve is to allow cool air to enter the vacuum pump. Many people think a vacuum relief valve will prevent the vacuum tank from collapsing. Vacuum tanks must be constructed to withstand maximum vacuum. VitalQuip recommends these valves to be replaced every 12 months.

The purpose of a pressure relief valve is to allow the vacuum/pressure tank from coming under undue stress when the tank is under pressure. The pressure is supplied when the vacuum pump has its air flow reversed or the product in the tank expands.

MANWAYS & CAMLOCKS



Many, if not all vacuum tankers have manways and camlock fittings somewhere on the tank. Although they need minimal maintenance, there are some procedures that need to be followed. These manways are solely for the purpose of cleaning the tank. Unauthorised persons entering a tank risk injury and possibly death. Only qualified persons trained in confined space awareness and wearing correct breathing apparatus are qualified to enter a vacuum tank.

TO OPEN MANWAYS

When opening manways, ensure the vacuum tank is neutral, that is free of vacuum and also of pressure. Do this by opening the drain valve on the SSO slightly.



When carrying out this work, it is considered safe work practice to stand to the side rather than over or in front of the manway or camlock to be opened or removed. Follow the procedure below;

1. Undo and remove the wingnuts by turning them anti-clockwise.
2. Lift the lid from opposite the hinge.
3. Once 'free' open the lid.

TO CLOSE MANWAYS

1. Refit the lid and replace the eyebolts.
2. Ensure the manway lid is centrally located over the neck prior to tightening the wingnuts.

DISCONNECTING CAMLOCKS

When refitting camlock's, ensure the vacuum tank is neutral, that is free of vacuum and also of pressure. Do this by opening the drain valve on the SSO slightly or by operating the vacuum relief valve on top of the SSO.

When carrying out this work, it is considered safe work practice to stand to the side rather than over or in front of the manway or camlock to be opened or removed. Follow the procedure below;

1. Undo the camlock arms by pushing them away from you.
2. Remove the camlock.
3. Once 'free' remove the camlock & fit hose or clean as required.

TO REFIT CAMLOCK

4. Prior to refitting the camlock arms grease the seal and the cam arms
5. Refit the camlock and pull both arms towards you at the same time to engage each cam at the same time.

HYDRAULIC SYSTEM INFORMATION

This vacuum system and other functions may be controlled by hydraulic operation.

Your unit has two hydraulic pumps one to operate the vacuum pump and the second to operate auxiliary controls including the suction boom, full opening rear door and the tipping function.

If a hydraulic system is used, the following occurs;

- Engage the PTO and it spins the hydraulic pump,
- The hydraulic pump draws oil from the oil tank,
- The hydraulic pump then pressurises the oil,
- The pump sends the oil to the operating spool/s,
- At the valve you can cause the oil to spin the vacuum pump

To ensure the system operates correctly, the operator needs to be aware of the following;

1. The oil contained within the system will generate heat as it is pressurised, the longer it is used the more heat it will generate.
2. There is a hydraulic cooler located either behind the cabin or between the chassis rails. Check this cooler weekly to ensure it is operating and the cooling fins are free of any mud or debris.
3. The operating spool has a pressure relief valve which has been pre-set to the supplier's recommended pressure. The purpose of this valve is to allow the oil an escape route when you inadvertently hold a lever on too long.

Check each fitting for leaks and to make sure all fittings are tight. When checking, ensure heavy duty gloves and eye protection are worn. Use extreme caution when checking when the system is running as there is risk of oil invasion under skin.

Check the oil level at the start of each day by looking at the sight indicator on the tank.



The hydraulic oil should be changed every 12 months. When changing the oil also change the oil filter which is generally located either on the side of the chassis or between the chassis rails. This work must be carried out by a **qualified hydraulic technician**.

HYDRAULIC TIPPING TANKS



Before tipping the tank please consider the following points:

1. Check that all tyres and frame/suspension is not damaged and is safe to tip.
2. Check overhead, ensure that the work area is free of power lines, cables and overhead objects that the unit will be likely to hit.
3. Ground surface must be of a hardstand nature to ensure that truck stays level at all times when tipping.
4. Open the rear door or drain valve and leave in open position before tipping.
5. Do not tip the tank in a high wind. High wind gusts may cause truck to tip over
6. Ensure that product empties evenly from the tank. Excessive product hang up on one side will cause the truck to become unbalanced.
7. Stay out of the 10m crush zone when tipping the tank. Never allow personal to enter under raised tank.
8. Always ensure suction boom is moved to the right side of the truck before tipping.
"Please refer to the section boom operating procedures to move suction boom"

If your tank is fitted with a safety prop, follow the procedure below for using this tool;

1. Lift tank up to full lift height,
2. Lift up prop,
3. Lower tank slowly until it rests on the prop. Release the lever as soon as it comes to rest; do not hold the lever on.



4. When completed and everyone is clear from underneath the tank, lift the tank up until it is off the prop,
5. Lower prop down,
6. Slowly lower the tank down into its original position.

HYDRAULIC OPENING REAR DOORS



To open and close the rear door, follow the procedure outlined below. Failure to observe this procedure may result in serious injury or death. Never stand under an open door unless it is propped securely.

1. Ensure the truck is parked on level and stable ground.
2. Ensure the vacuum tank is neutral, i.e. no vacuum or pressure is present inside the tank.
3. Unload the liquid through the dump valve prior to opening the door.
4. Ensure the suction boom will not foul with the door when opening.
5. Ensure that there are no persons in the vicinity of the rear door opening area and that there is adequate room for the door to swing upwards safely.
6. Open the rear door clamps. Do a visual inspection to ensure all clamps are open.
7. Operate the rear door lever by operating the lever. Less pressure on the lever will result in the door opening slowly and smoothly. Ensure the door is fully opened prior to tipping.
8. If required tip the tank to complete the cleaning process by pulling the lever towards you. Less pressure on the lever will result in the tank lifting slowly and smoothly. Ensure the door is fully opened prior to tipping.



Lowering the tank and closing the door

1. Lower the tank so it sits on the chassis sub frame, ensure that there are no persons standing within the area directly under the tank as injury or death may result. Do not push the tip lever all the way forward; gently push the lever away from you to lower the tank safely and in a controlled manner.
2. Ensure that there are no persons in the vicinity of the rear door closing area and that there is adequate room for the door to close safely.
3. Ensure the seal and door is free from any product prior to closing the door. Damage may occur to the seal or door if debris is present. Use a hose or broom to remove any debris.
4. Operate the rear door lever by pushing the lever away from you. Less pressure on the lever will result in the door closing slowly.
5. Once the door is lowered, keep the closing lever pushed forward until you hear of all the locks engage.
6. You will be able to hear as each lock completes the over centre process.
7. Ensure all of the locks are closed and are engaging on the door closing surface prior to driving away. Failure to do so may result in product leaking from the tank.

JETTING REEL CONTROL

The jetting reel is controlled by a control panel mounted on the reel. To operate the reel ensure that the PTO is engaged then press the button in the left hand side control panel to supply the reel with oil.



HYDROSTATIC DRIVE

This unit is fitted with a Hydrostatic drive function. This function will propel the unit forward while the PTO is in use. To operate Hydrostatic drive ensure the PTO's are engaged and the park brake is released. The control unit for the Hydrostatic drive is mounted inside the cab in the centre of the Dash. To turn on the control move the toggle switch to the down position. Then turn the control dial till the unit reaches the desired speed. To stop simply turn dial back to the original position.

PERSONAL PROTECTION EQUIPMENT

PPE must be worn at all times when operating, maintaining and cleaning this equipment. The appropriate PPE should be sourced from a suitable supplier and can consist of the following items:

- Full face clear visor / safety glasses
- Elbow length rubber coated gloves
- Hearing protection (plugs or ear muffs)
- Overalls; waterproof and disposable
- Rubber boots, steel capped safety toe
- Appropriate breathing apparatus when required

SAFETY PROCEDURES

DESIGN PHASE

Current work health and safety regulations place considerable emphasis on designing safe plant and equipment. This is a critical step in the elimination of hazards in the workplace. Detailed analysis of potential hazards must be undertaken at this early planning phase. Any safety issues must be eliminated or mitigated at this stage.

MANUFACTURE PHASE:

As with design, the manufacturing stage provides another opportunity to ensure that products are manufactured in such a way that hazards are not introduced into the workplace. Again, detailed analysis of any potential hazard needs to be conducted at this stage. Information on the risk assessment and operating manuals must be passed on to the installer / commissioner / user.

USE OF THE TANKER/EQUIPMENT:

Before any work is conducted, a risk assessment must be undertaken on the tanker and the task involving the unit. A standard operating procedure should then be developed incorporating the safe controls identified in the risk assessment. This should also include information such as: owner of the tanker, the authorisation to use it, any training or certification by plant/equipment operators, emergency provisions, clean-up procedures, decommissioning etc.

RISK ASSESSMENT

Undertaking a risk assessment involves analysing all the risks associated with potential hazards, and evaluating them to determine steps for the safe elimination or control of these hazards. VitalQuip has assessed the potential risks associated with the plant that they manufacture/maintain.

The customer must also ensure that all risks are assessed that may arise from:

- Systems of work associated with the use of the tanker,
- Layout and condition of the work environment where the tanker is to be used,
- Capability, skill and experience of the person engaged in the use of the tanker,



- Reasonable, foreseeable conditions.

In carrying out a risk assessment, the customer must ensure that the following are identified:

- Parts of the tanker/equipment which require records to be kept so as to minimise risks to health & safety: and
- The type of records and the length of time records are to be kept.

A risk assessment may be carried out on individual items of plant or, where multiple items of plant are of the same design are installed and used under conditions which are the same for all practical purposes, the risk assessment may be carried out on a representative sample subject to the qualification that where the risk may vary from operator to operator, a separate assessment of the risk to each operator of the particular plant is carried out on each item of plant.

A sample risk assessment and safe work method statement is included that can be used when carrying out the above procedures.

MAINTENANCE SCHEDULES

The following pages outline recommended maintenance operations relevant to specific components and/or time and operations schedules.

This relates only to VitalQuip fitted equipment.

Ensure that this document is copied. Copies placed in the vehicle and in the servicing workshop for a maintenance log to be kept, followed and maintained for safe working conditions and effective equipment operation.

Ensure correct protective clothing and safety equipment is worn at all times when working on this equipment.



EVERY OPERATION

Carry out the following and tick (✓) the box when complete:

ITEM	<input checked="" type="checkbox"/>
Check and monitor pump operating temperature	<input type="checkbox"/>
Check and monitor hydraulic oil temperature	<input type="checkbox"/>
Check and monitor vacuum gauge each operation	<input type="checkbox"/>
Check secondary moisture trap for contamination	<input type="checkbox"/>
Check cyclone separator for contamination	<input type="checkbox"/>
Check rear door locks are correctly closed	<input type="checkbox"/>

Ensure correct protective clothing and safety equipment is worn at all times when working on this equipment.

Authorised person to carry out service work: (Print Name) _____

Date work carried out _____

Notes on findings & service work carried out



DAILY CHECKS

Carry out the following and tick (✓) the box when complete:

ITEM

- | | |
|--|-------------------------------------|
| Check hydraulic oil level | <input checked="" type="checkbox"/> |
| Check water filter for contamination | <input type="checkbox"/> |
| Check all locking clamps and pins for excessive wear | <input type="checkbox"/> |
| Check for hydraulic oil leaks | <input type="checkbox"/> |
| Empty secondary shut off every load | <input type="checkbox"/> |
| Check liquid ring tank and water level | <input type="checkbox"/> |
| Check solenoid valve for correct operation | <input type="checkbox"/> |
| Check rear door locks are correctly closed | <input type="checkbox"/> |

Ensure correct protective clothing and safety equipment is worn at all times when working on this equipment

Authorised person to carry out service work: (Print Name) _____

Date work carried out _____

Notes on findings & service work carried out



WEEKLY CHECKS

Carry out the following and tick (✓) the box when complete:

ITEM	<input checked="" type="checkbox"/>
Check and clean all sight glasses and/or Sight Tube	<input type="checkbox"/>
Check and clean primary shut off	<input type="checkbox"/>
Check and clean secondary shut off	<input type="checkbox"/>
Check and clean vacuum relief/pressure valve	<input type="checkbox"/>
Check hydraulic oil levels	<input type="checkbox"/>
Visual check of all suction lines and clamping devices on system	<input type="checkbox"/>
Check all camlock fittings and seals	<input type="checkbox"/>
Clean cyclone separator	<input type="checkbox"/>

Ensure correct protective clothing and safety equipment is worn at all times when working on this equipment.

Authorised person to carry out service work: (Print Name) _____

Date work carried out _____

Notes on findings & service work carried out



MONTHLY CHECKS

Carry out the following and tick (✓) the box when complete:

ITEM	<input checked="" type="checkbox"/>
Disassemble secondary shut off and pressure wash	<input type="checkbox"/>
Disassemble primary shut off and pressure wash	<input type="checkbox"/>
Check all manway / shut off rubbers and apply anti-seize to swing bolt threads	<input type="checkbox"/>

Ensure correct protective clothing and safety equipment is worn at all times when working on this equipment.

Authorised person to carry out service work: (Print Name) _____

Date work carried out _____

Notes on findings & service work carried out



THREE MONTHLY CHECKS

Carry out the following and tick (✓) the box when complete:

ITEM	<input checked="" type="checkbox"/>
Check vacuum pump (visual inspection)	<input type="checkbox"/>
Check primary and secondary shut off balls for integrity	<input type="checkbox"/>
Check tank mounting bushes, stays and hoist mounts	<input type="checkbox"/>
Check tank mounting springs and all bolts	<input type="checkbox"/>
	<input type="checkbox"/>

Ensure correct protective clothing and safety equipment is worn at all times when working on this equipment.

Authorised person to carry out service work: (Print Name) _____

Date work carried out _____

Notes on findings & service work carried out



**Owner's Manual
&
Operating Instructions**

Models 4307 & 4310 Blower



Visit our web site to download pump setup guides,
brochures and other technical information.



4307 & 4310 Blowers

Owner's Record

Date of Purchase: _____

Purchased from: _____

Serial Number: _____

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Introduction

General Information



About National Vacuum Equipment

Congratulations! You now own a quality vacuum/pressure pump 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 components, 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

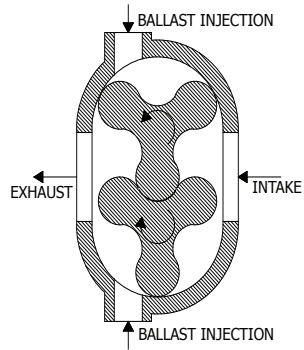
Should a potential warranty situation arise, the following procedures must be followed:

- 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.

Overview

General Blower Operation

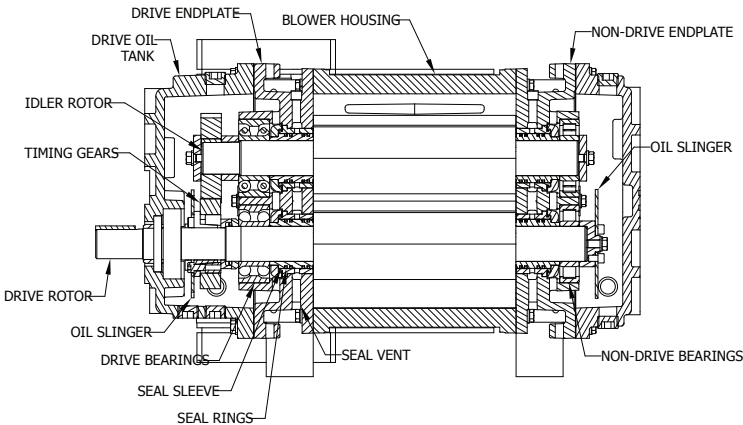
The NVE BLOWERS are severe duty vacuum pumps, designed to be used in liquid waste pumping systems where extended operation is desired. The pump incorporates a ballast air cooling system to provide superior cooling, allowing for extended operation.



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



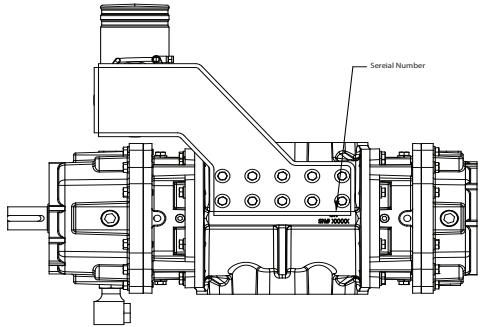
Location of Serial Number

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 gasses. 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 gasses.

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‡ (°F)	Ballast Inlet Temp (°F)
	Max	Min							
4307	4000	2000	FULL VAC	14	10	*	300	235	*
4310	4500	2400	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

RPM		Vacuum (Inches of Mercury)						Pressure (PSI)				
		0	9	15	18	21	24	27	5	10	15	18
2000	HP	2.0	7.4	11.0	12.8	14.6	16.4	-	8.1	14.2	20.3	24.0
	CFM	280	171	114	77	26	-	-	183	143	113	97
2500	HP	2.5	9.2	13.7	16.0	18.2	20.5	-	10.1	17.7	25.4	29.9
	CFM	349	241	184	147	96	17	-	253	213	183	167
3000	HP	3.0	11.1	16.5	19.2	21.9	24.6	27.3	12.1	21.3	30.4	35.9
	CFM	419	311	254	217	166	87	-	323	283	253.0	237.0
3500	HP	3.5	12.9	19.2	22.4	25.5	28.7	31.8	14.2	24.8	35.5	41.9
	CFM	489	381	324	286	236	157	-	393	353	322.0	307.0
4000	HP	4.0	14.8	22.0	25.6	29.2	32.8	36.4	16.2	28.4	40.6	47.9
	CFM	559	451	394	356	306	227	57	463	423	392	376

When installing a NVE 4307 blower we recommend a normal R.P.M. range from 2700 to 4000. Other speeds are o.k. as long as exhaust gas temperatures read on the supplied thermometer do not exceed 290 degrees F over ambient temperature.

4310

RPM		Inches of Vacuum (Hg)				Pressure (PSI)
		0	18	24	27	10
2400	Hp.	2	17.8	23.1	-	24.8
	CFM	500	407	255	-	324
4000	Hp.	4	35.6	46.1	51.4	39.7
	CFM	826	661	528	182	631
4500	Hp.	4.5	40	51.9	57.8	44.7
	CFM	931	763	660	270	733

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 the pump. When installing an NVE 4310 blower we recommend a normal R.P.M. of 4000. Other speeds are o.k. as long as exhaust gas temperatures read on the supplied thermometer do not exceed 375 degrees F.

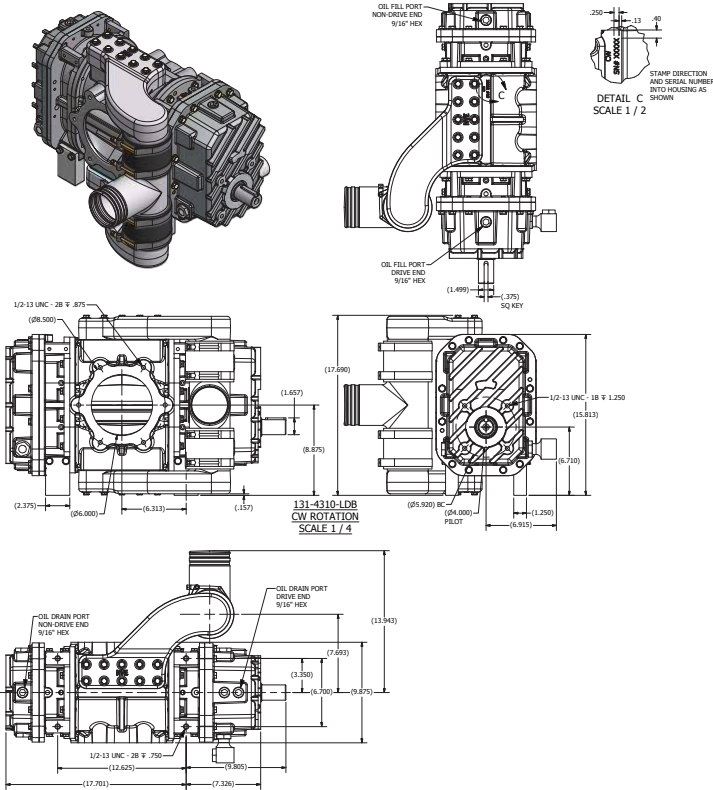
Maximum 4500 RPM Intermittent Operation Only.

ACFM - Actual CFM generated on the vacuum or pressure side of the machine

B.O. - Blanked Off

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 on Use

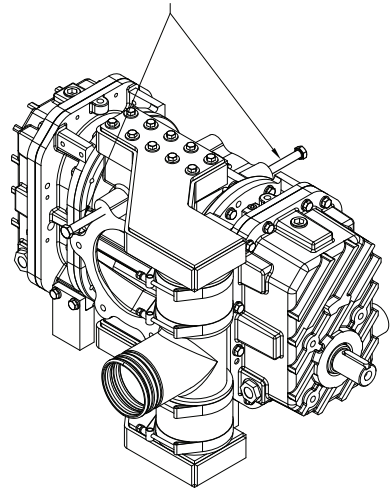
Limitation on Use	Reason for Limitation and/ or Risk	Corrective Actions
Operation of the blower in an explosive environment	Fire and/or explosion can result	DO NOT USE
Using blower to move explosive, toxic or dangerous gases	Fire and/or explosion can result Pollution of the environment Health risks to operators	
Liquid drawn into blower intake	Blower seizure, damage to blower and ejection of parts	Install a moisture trap or cyclonic separator on the intake nozzle of the blower.
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	318
	4310-LDB	338
	4310-LDM	426
4307	4307-LD	270
	4307-LDM	412

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.

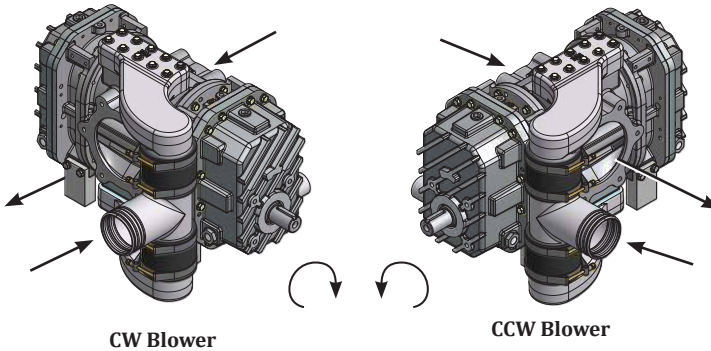
Before installing a blower that has been stored for any length of time, remove the intake and exhaust covers and inspect the rotors and cylinders to insure the absence of rust. In addition, remove the oil fill plug on drive oil tank and inspect the gear for absence of rust.



- 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 RPM'S 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 belt tension could damage the blower and prime mover.**
- **Belts and pulleys must be guarded to prevent entanglement.**

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 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.

Tunable Ballast Silencer (4310 Blower)

A tunable ballast silencer provides for field tuning of the ballast circuit to minimize the noise for customer specific operating points.

If using a non-OEM silencer, it should be tested for effectiveness in the same fashion as described above for exhaust silencers.

Inlet Filter

The intake filters are designed to ensure maximum airflow efficiency why 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.

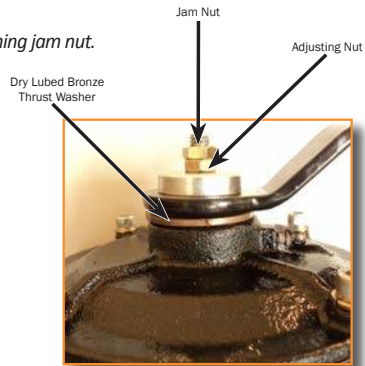
Four Way Valve cont.

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 ¼ 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 ¼ 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.



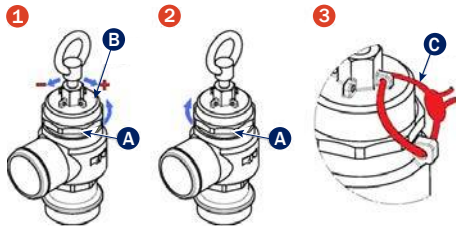
Pressure Relief Valve

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

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.

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.

Initial Start Up Preliminary Checks Cont.

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 per the maintenance table.

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

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.

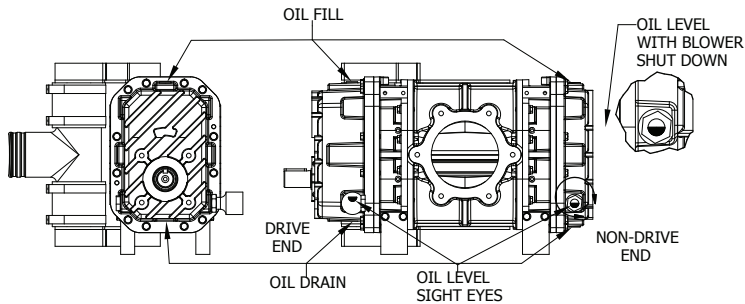
Change Gear Casing Lube; first 500 hours, then every 1,000 hours.

- 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.



CHANGE OIL IN BOTH DRIVE AND NON-DRIVE OIL TANKS

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			

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

4307 Blower Maintenance

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)
- Working climate and conditions

It is therefore up to the operator to adjust the following schedule accordingly.

Lubrication:

Unlike a typical rotary vane vacuum pump, the Challenger Series 4307 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.

Main Pump Housing – Diesel flush; At least weekly.

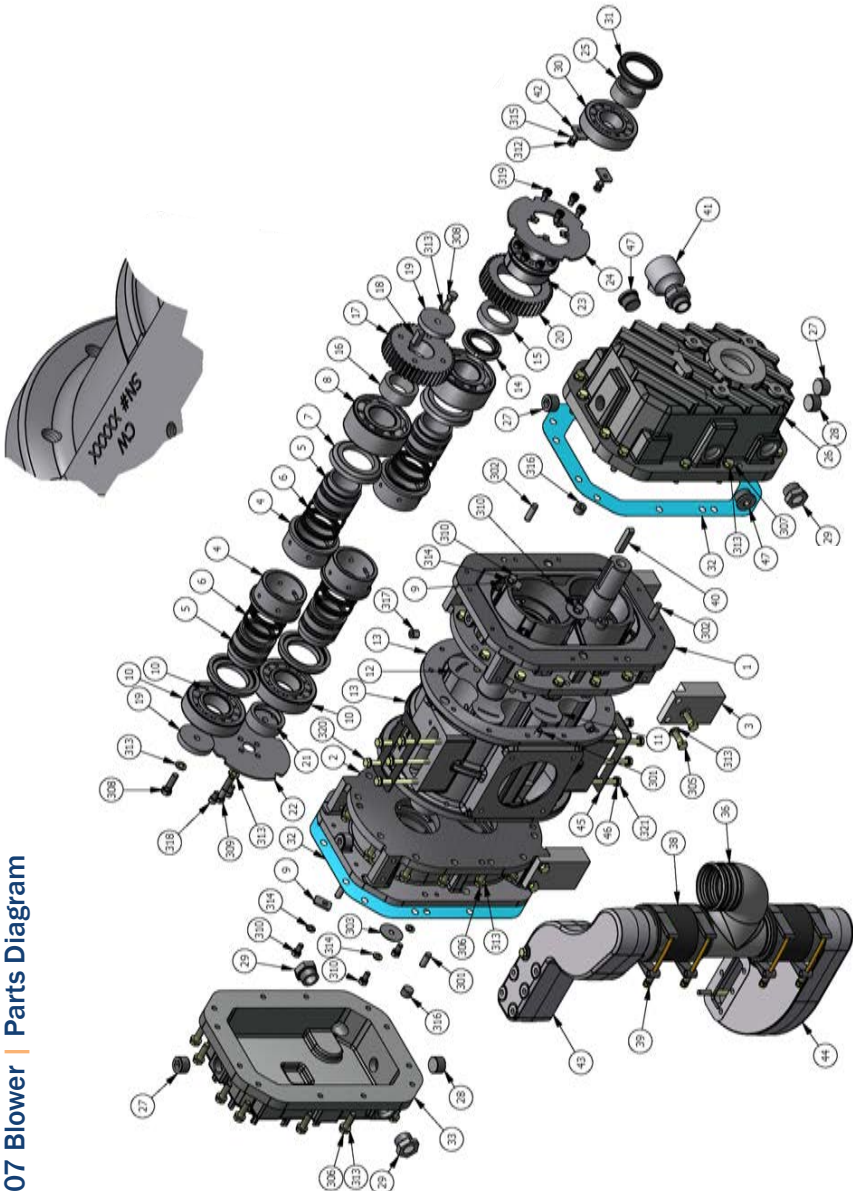
- Your blower comes standard with a diesel flush kit installed. This is used to introduce small amounts of diesel into the machine to clean out debris and inhibit rust. Note this procedure is also followed daily in cold climates to help keep any moisture that may be in the blower from freezing up.
- Make sure the reservoir contains diesel 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 diesel flush reservoir and close it after 2 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.



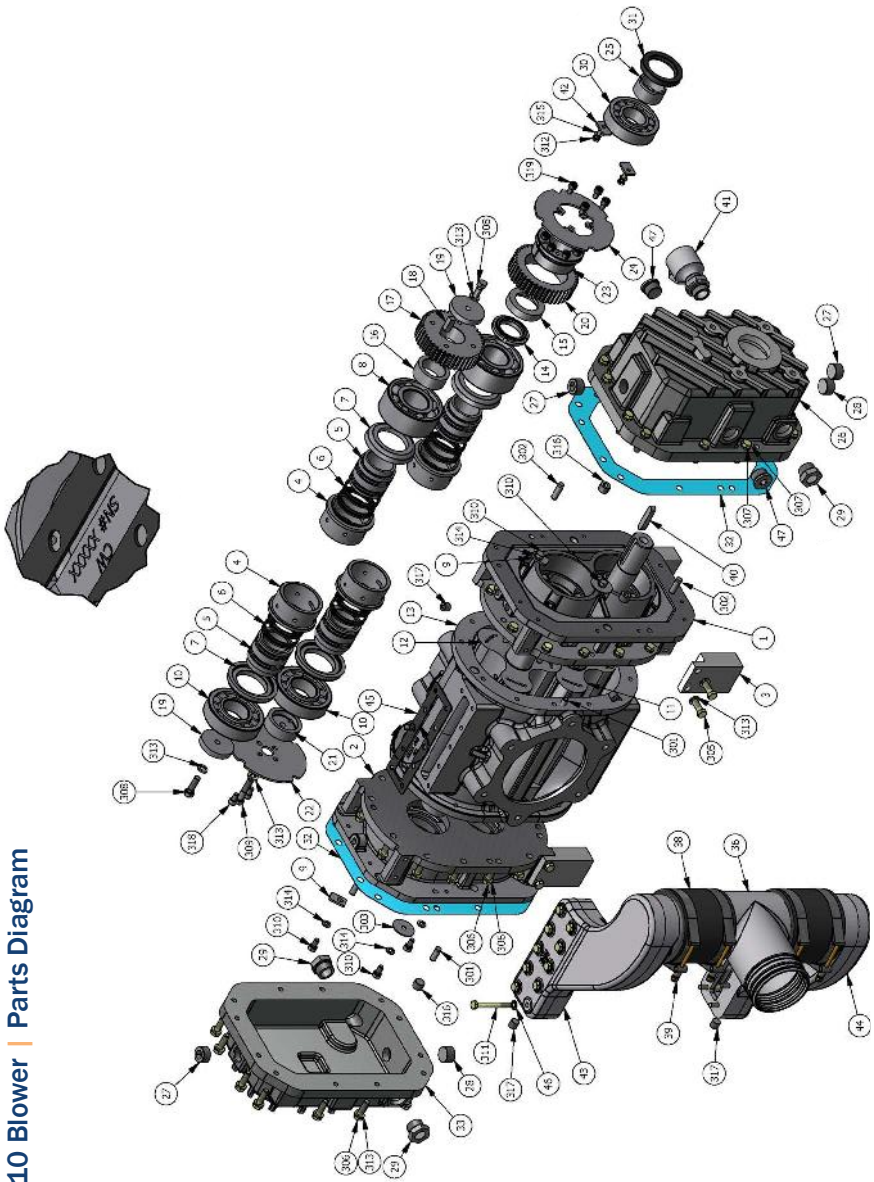
Vacuum/Pressure Changeover Valve; As needed.

- 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.

4307 Blower | Parts Diagram



4310 Blower | Parts Diagram



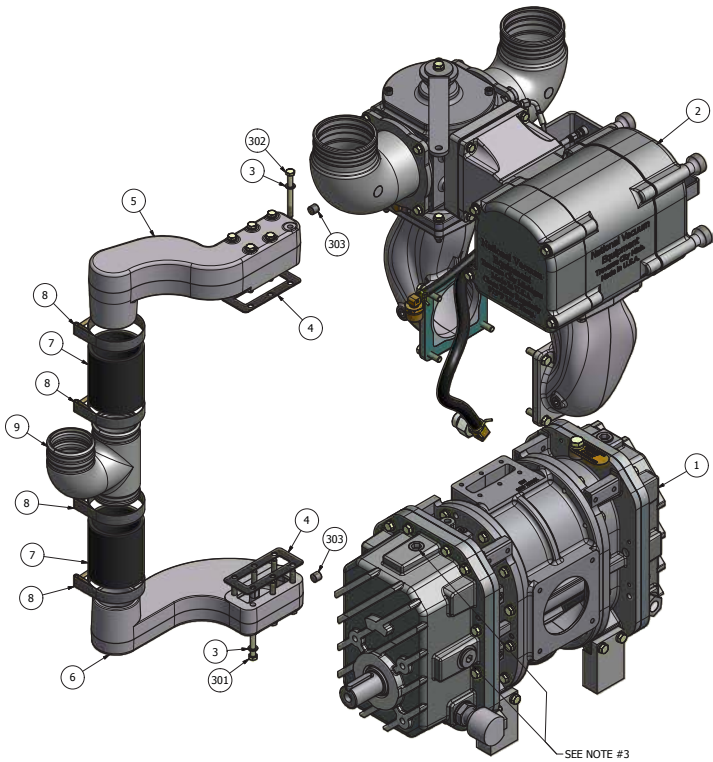
4307 & 4310 Blower Complete | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	150-003-4310-1	ENDPLATE, DRIVE 4310 MACH
2	1	150-003-4310-2	ENDPLATE, NONDRIVE 4310 MACH
3	4	150-652-001	MOUNTING FOOT, 4310
4	4	150-630-747	SEAL SLEEVE, OD 4310/747
5	4	150-629-4310	SEAL SLEEVE, ID 4310
6	16	150-618-747	SEAL RING, 2.5 OD CAST IRON
7	4	150-631-747	SLINGER, SHAFT GUARD, 747
8	2	150-621-747	BEARING, 5309 (45 X 100 X 39.7)
9	4	150-047-957	BEARING RETAINER, 957
10	2	150-622-747	BEARING, NU309 (45 X 100 X 25)
11	1	150-005-4307-D	ROTOR, DRIVE 4307
11	1	150-005-4310-D	ROTOR, DRIVE 4310
12	1	150-005-4307-I	ROTOR, IDLER 4307
12	1	150-005-4310-I	ROTOR, IDLER 4310
13	1	150-001-4307	HOUSING MAIN 4307
13	1	150-001-4310	HOUSING MAIN 4310
14	1	150-645-747	LOCK NUT DRIVE, ROTOR, 747
15	1	150-641-747	RETAINER, LOCKNUT 747
16	1	150-633-747	SPACER, DRIVE END, FOLLOWER 747
17	1	150-613-747	TIMING GEAR, IDLER, 747
18	1	150-006-001	KEY, .375 SQ X 2" 1018 +.001/-.000
19	2	150-638-747	RETAINER, IDLER ROTOR 747
20	1	150-612-747	TIMING GEAR, DRIVE, 747
21	1	150-636-747	RETAINER, NONDRIVE END, 747
22	1	150-637-747	OIL SLINGER, NON-DRIVE END 747
23	1	150-624-747	B-LOC, RETAINING RING, FLANGED
24	1	150-635-747	OIL SLINGER, DRIVE END 747
25	1	150-009-747	SEAL SLEEVE, OUTER
26	1	150-627-747	END COVER, DRIVE END 4310
27	3	120-047	DRAIN PLUG, 3/4" NPT
28	2	120-047-1	DRAIN PLUG, 3/4" NPT MAGNETIC
29	3	150-048	SIGHT EYE, 1 1/16"-12 SAE
30	1	150-623-747	BEARING, NU308 (40 X 90 X 23)
31	1	150-620-747	SEAL, 50 X 72 X 10 AS FMK
32	2	150-639-747	GASKET, END COVER 747
33	1	150-628-747	OIL COVER, NON-DRIVE 747/4310
36	1	802-650-009	BALLAST TEE W/ RISER, 4307 CAST
36	1	802-650-003A	BALLAST TEE, 4310 CAST

4307 & 4310 Blower Complete | Parts List *Continued*

ITEM	QTY	PART NUMBER	DESCRIPTION
38	2	426-300-TAR-4	HOSE, 3", TAR & ASPHALT-4 IN LG
38	2	426-400-TAR-4IN	HOSE, 4", TAR & ASPHALT-4 IN LG
39	4	426-3875-TBC	CLAMP, T-BOLT 3.875"
39	4	426-4625-TBC	CLAMP, T-BOLT, 4.625"
40	1	120-006	KEY, 3/8" X3/8" X 2
41	1	150-048-001	SIGHT EYE, 90 DEG-1 1/16-12 SAE
42	2	150-047-4310	BEARING RETAINER, 4310
43	1	150-650-006	BALLAST MANIFOLD, LH 4307 MACH
43	1	150-650-004	BALLAST MANIFOLD, LH 4310 MACH
44	1	150-650-007	BALLAST MANIFOLD, RH 4307 MACH
44	1	150-650-005	BALLAST MANIFOLD, RH 4310 MACH
45	2	150-616-4307	GASKET, BALLAST MANIFOLD, 4307
45	2	150-616-4310	GASKET, BALLAST MANIFOLD, 4310
46	12	150-099-008	WASHER, 5/16 SEALING BUNA
46	20	150-099-008	WASHER, 5/16 SEALING BUNA
47	2	150-047-003	PLUG SAE ORB -12
301	4	DP - 3/8 X 1.00	DOWEL PIN - 3/8 X 1.00 LG
302	2	DP - 3/8 X 1.25	DOWEL 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 PLATE
304	2	HHCS - 5/16-18 UCN x 0.75	HEX HEAD CAP SCREW 5/16-18 UCN 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	2	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
311	20	HHCS - 5/16-18 UNC X 2.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 2.75
312	2	HHCS - 1/4-20 UNC X 0.75	HEX HEAD CAP SCREW - 1/4-20 UNC X 0.75
313	59	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	6	HHCS - 5/16-18 UNC X 3.25	HEX HEAD CAP SCREW - 5/16-18 UNC X 3.25
321	6	HHCS - 5/16-18 UNC X 3	HEX HEAD CAP SCREW - 5/16-18 UNC X 3

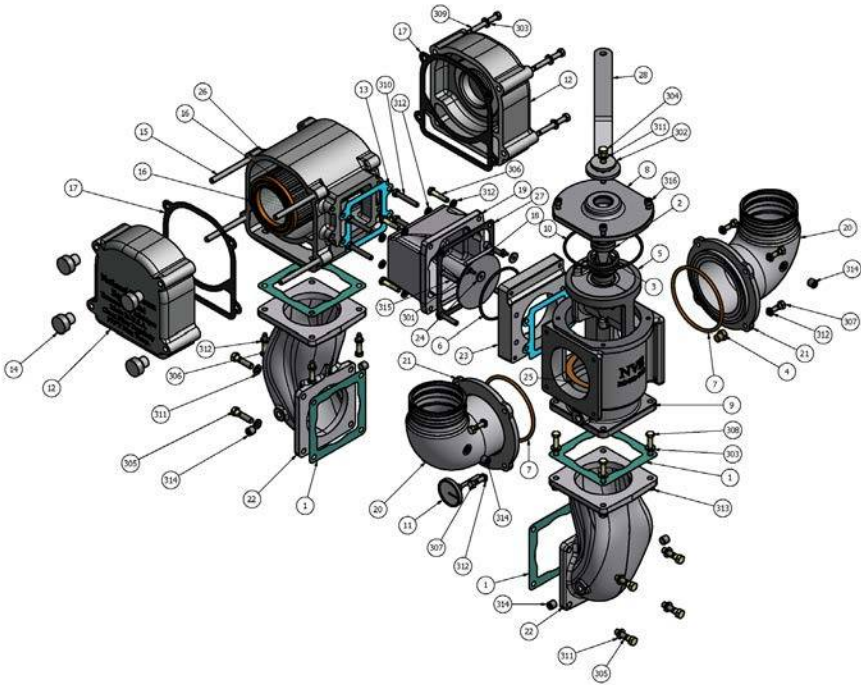
4307 Blower 4-Way Intake Manifold | Parts Diagram



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



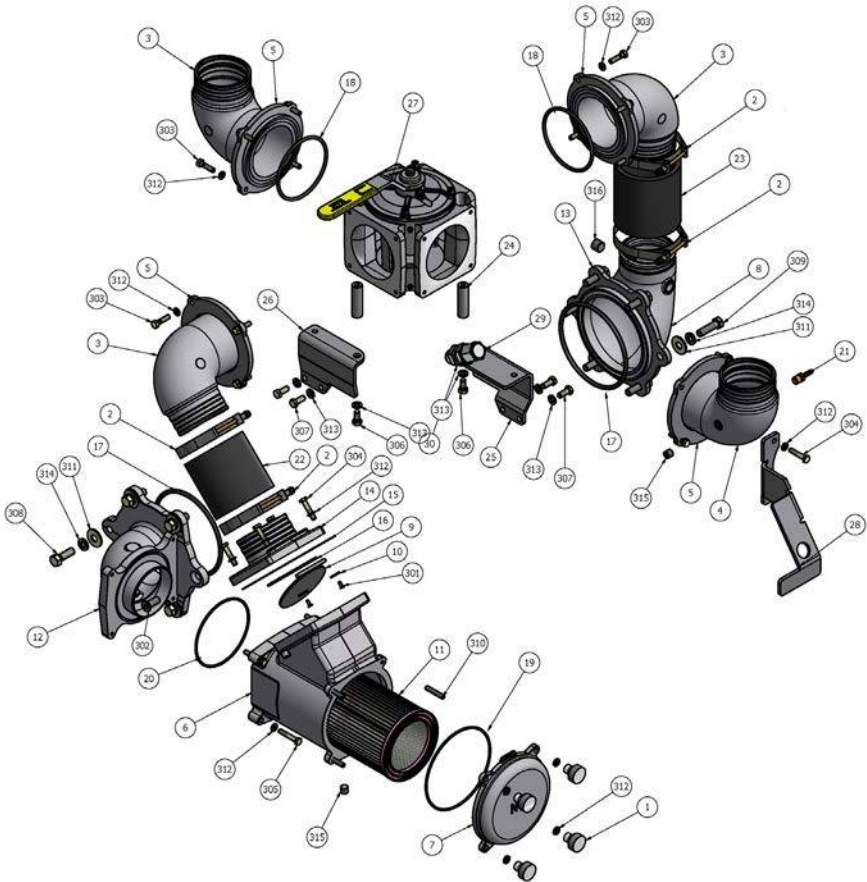
4307 Blower 4-Way Manifold | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	120-039-506	GASKET, 4" INT/EXH FLANGE
2	2	120-040	4-WAY VALVE SEAL 3" & 4" VITON
3	1	120-045	4-WAY FV SPRING (COMPRESSED)
4	1	120-059	PLUG, BRASS 1/4" NPT, HEX HD.
5	1	120-062-367	PLUG, 4-WAY W/ FILTER
6	1	120-064-003	O-RING, 2-240 VITON
7	2	120-064-012	O-RING, 2-350 VITON
8	1	120-065	TOWER, 4-WAY W/ FILTER
9	1	120-067-506	4-WAY HOUSING, 4" W/ FILTER
10	1	120-068	O-RING, 2-252 VITON
11	1	120-220	THERMOMETER, 50- 400 DEG, 2" FACE, 2.5" STEM, 1/4" - 18NPT
12	2	120-310	FILTER COVER

4307 Blower 4-Way Manifold | Parts List *Continued*

ITEM	QTY	PART NUMBER	DESCRIPTION
13	2	120-311	GASKET, FILTER HOUSING, 4-WAY
14	4	120-312	KNOB, 3/8-16 UNC
15	4	120-313	STUD, 3/8-16UNC-2A x 4-3/8" SS
16	1	120-314	FILTER ELEMENT, INLET 367/506
17	2	120-315	GASKET, FILTER COVER
18	1	150-041-007	CHECK VALVE FLAPPER, 4 IN SS
19	1	150-041-008	CHECK VALVE HOUSING 4307
20	2	150-063-001	ELBOW, ADJ 4" W/ 1/4 NPT
21	2	150-063-005	FLANGE, 4" ADJ-ELBOW
22	2	150-063-008	ELBOW MANIFOLD 4307 MACH
23	1	150-063-009	CHECK VALVE FLANGE MANIFOLD 4307 MACH
24	2	150-099-007	WASHER, #10 FLAT HD
25	1	150-099-010	WASHER, THRUST BRONZE, 5.25" OD .06"
26	1	150-309-4307	FILTER HOUSING, 4"
27	1	150-616-002	GASKET, 4" SQ INTAKE CHECK
28	1	412-060-005	HANDLE, 4307, OFFSET 4-WAY ADJ
29	1	412-060-005	HANDLE, 4307, OFFSET 4-WAY ADJ
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
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	9	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	8	PLUG - 1/4 NPT SH	SOCKET HEAD PLUG - 1/4 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

4310 Blower 4-Way Intake Manifold | Parts Diagram



4310 Blower 4-Way Intake Manifold | Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	120-312-002	KNOB, 5/16-18UNC
2	4	426-4625-TBC	CLAMP, T-BOLT, 4.625"
3	3	802-063-001	ELBOW, 4" 90 DEG ALUM
4	1	150-063-001	ELBOW, ADJ 4" W/ 1/4 NPT
5	4	150-063-005	FLANGE, 4" ADJ-ELBOW
6	1	150-309-001	HOUSING, FILTER MACHINED 4310
7	1	150-310-002	COVER, FILTER 4310
8	1	150-063-002	ELBOW, ADJ 6" TO 4" MACH
9	1	150-041-007	CHECK VALVE FLAPPER, 4 IN SS
10	2	150-099-007	WASHER, #10 FLAT HD
11	1	150-314-002	FILTER, STAINLESS 4310
12	1	150-063-003	ELBOW, INTAKE 4310

ITEM	QTY	PART NUMBER	DESCRIPTION
13	1	150-063-006	FLANGE, RETAINING 6" ADJ ELBOW
14	1	150-063-004	FLANGE, CHECK 4" 4310
15	1	150-616-001	GASKET, 4" SQ INTAKE CHECK
16	1	120-064-003	O-RING, 2-240 VITON
17	2	120-064-011	O-RING, 2-438 VITON
18	4	120-064-012	O-RING, 2-350 VITON
19	1	120-064-013	O-RING, 2-259 VITON
20	1	412-102-251	O-RING, 2-251, FPM
21	1	310-LP6	HOSE BARB, 1/4 TO 1/4NPT STRT
22	1	426-400-TAR-4-5IN	HOSE, 4", TAR & ASPHALT-4-5 IN LG
23	1	426-400-TAR-5IN	HOSE, 4", TAR & ASPHALT-5 IN LG
24	2	150-122-001	STANDOFF, 3/8 UNC X 2.6"L STL
25	1	150-644-001	BRACKET, CW 4-WAY 4310 EXH
25	1	150-644-003	BRACKET, CCW 4-WAY 4310 EXH
26	1	150-644-002	BRACKET, CW 4-WAY 4310 INT
26	1	150-644-004	BRACKET, CCW 4-WAY 4310 INT
27	1	410-004-002-NF	VALVE, 4" 4-WAY, ASSEMBLY NO FLANGES
28	1	150-644-005	BRACKET, OIL FILL 4310, CW
28	1	150-644-006	BRACKET, OIL FILL 4310, CCW
29	1	440-001-051	FITTING, CAP, 3/4" JIC
30	1	440-001-050	FITTING, BULKHEAD, 3/4" JIC W/LOCKNUT
301	2	FSCS - 10-24 UNC X 0.50	FLAT SOCKET CAP SCREW - 10-24 UNC X 0.50
302	1	FSCS - 1/2-13 UNC X 1.25	FLAT SOCKET CAP SCREW - 1/2-13 UNC X 1.25 ZINC
303	16	HHCS - 5/16-18 UNC X 1.25	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.25
304	6	HHCS - 5/16-18 UNC - 1.50	HEX HEAD CAP SCREW - 5/16-18 UNC - 1.50
305	4	HHCS - 5/16-18 UNC X 1.75	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.75
306	2	HHCS - 3/8-16 UNC x 0.75	HEX HEAD CAP SCREW - 3/8-16 UNC x 0.75
307	4	HHCS - 3/ 8-16 UNC X 0.875	HEX HD CAP SCREW - 3/8-16 UNC X 0.875
308	5	HHCS - 1/2-13 X 1.50	HEX HEAD CAP SCREW - 1/2-13 UNC X 1.50
309	6	HHCS 1/2-13 UNC - 1.75	HEX HEAD CAP SCREW - 1/2-13 UNC - 1.75
310	4	SS - 5/16-18 UNC X 1.75	HEXAGON SOCKET SET SCREW - CUT POINT ZINC
311	11	FW 1/2 USS	FLAT WASHER 1/2" USS
312	30	LW - 5/16	LOCK WASHER, 5/16"
313	6	LW - 3/8	LOCK WASHER, 3/8"
314	11	LW - 1/2	LOCK WASHER, 1/2
315	2	PLUG - 1/4 NPT SH	SOCKET HEAD PLUG - 1/4 NPT
316	1	PLUG - 1/2 NPT SH	SOCKET HEAD PLUG - 1/2 NPT

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 accordingly. 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

NVE

National Vacuum Equipment, Inc.

2707 Aero Park Drive
Traverse City, MI 4968 USA

231.941.0215 Phone
231.941.2354 Fax

CARATTERISTICHE - CHARACTERISTICS

Pompa per vuoto volumetrica con rotori trilobati e sistema di raffreddamento ad iniezione laterale.
 Positive displacement vacuum pump with tri-lobe rotors and lateral injection cooling system.

Alto vuoto, livello di rumore ridotto, efficiente raffreddamento di tutti gli organi in movimento.
 High vacuum, low noise level, efficient cooling of all the moving parts.

A richiesta: trasmissione predisposta per motore idraulico.
 Upon request: drive elements for hydraulic motor.

Guarnizioni di lunga durata per alte temperature.
 Long life high temperature seals.

Funzionamento senza olio e senza usura.
 Operating without oil and without wear.


PRESTAZIONI – PERFORMANCES

Modello - Model	Velocità [min ⁻¹] Speed [r.p.m.]	Vuoto - Vacuum [%]								Pressione - Pressure [bar abs]				
		0 %		30 %		60 %		Max	1.5 bar		2.0 bar			
		Q m ³ /h	N kW	Q m ³ /h	N kW	Q m ³ /h	N kW		%	Q m ³ /h	N kW	Q m ³ /h	N kW	
PVT200	4200 (1400)	1280	5	1220	15	980	25	93	0	35	1120	25	1040	43
	4000 (1333)*	1235	4.5	1180	14	925	24	92	0	33	1065	24	990	40
	3800 (1266)	1185	4	1140	13	870	23	91	0	32	1010	22	940	38
	3400 (1133)	1090	3	1010	11	710	20	90	0	28	900	19	800	33
	3000 (1000)	1000	2	930	9	630	17	88	0	24	780	16	670	29
PVT280	3300	1800	7	1645	22	1450	37	93	0	52	1590	33	1480	59
	2900*	1560	5	1443	18	1250	32	91	0	46	1410	28	1280	52
	2500	1300	4	1220	15	1032	27	89	0	39	1190	23	1070	43
	2100	1150	3	981	13	801	23	87	0	31	1000	18	875	36
PVT400	3300	2500	8	2280	29	2010	50	93	0	71	2200	45	2050	81
	2900*	2160	6	2000	24	1730	43	91	0	62	1950	38	1770	71
	2500	1800	4	1690	20	1430	36	89	0	53	1650	31	1480	58
	2100	1590	3	1360	16	1110	30	87	0	42	1390	24	1210	48
PVT700	2500	4150	22	3800	52	3000	82	93	0	112	4000	80	3750	138
	2400*	3980	21	3580	49	2850	78	92	0	107	3830	76	3600	131
	2200	3650	19	3150	43	2550	70	91	0	98	3500	69	3300	118
	1900	3200	12	2800	32	2150	57	90	0	80	3000	55	2700	98
	1600	2700	7	2250	27	1650	47	89	0	66	2500	41	2150	81
PVT1000	2500	6400	42	5900	83	4900	127	93	0	175	5720	115	5350	188
	2400*	6100	37	5650	80	4700	124	92	0	171	5520	110	5250	180
	2200	5750	22	5150	68	4200	112	91	0	165	4920	101	4500	165
	1900	4800	19	4350	56	3600	94	90	0	134	4200	83	3870	142
	1600	4000	12	3600	43	2800	78	89	0	111	3570	68	3300	120

() Con moltiplicatore di giri – With gear box

*: Velocità consigliata – Suggested speed

I dati riportati in tabella si riferiscono al decompressore privo del gruppo di aspirazione, e sono soggetti ad una tolleranza pari a +/- 5%. - Actual performance may vary of 5% and are referred to the vacuum pump without suction group.

PRESSIONE SONORA – SOUND PRESSURE

Pressione sonora della sola pompa (senza trasmissione, gr. aspirazione, silenziatori a vuoto max, rpm max a 7m in campo libero).

Sound pressure of the pump only (without drive transmission, suction group, mufflers at max vacuum rate, max rpm at 7m in free field).

	PVT200	PVT280	PVT400	PVT700	PVT1000
	72 dB(A)	72 dB(A)	73 dB(A)	78 dB(A)	80 dB(A)

Pressione sonora media di fronte alla pompa su veicolo con presa di forza su trasmissione a 7m in campo libero. Rilievo in analogia alla norma ISO EN 3744.

Average sound pressure in front of the pump on a vehicle equipped with P.T.O. on cardan shaft. (at 7m in free field). Measures according to ISO EN 3744.

	PVT200	PVT280	PVT400	PVT700	PVT1000
	78 dB(A)	78 dB(A)	79 dB(A)	79 dB(A)	81 dB(A)

CONDIZIONI DI RIFERIMENTO – REFERENCE CONDITIONS

Gas convogliato: aria - Conveyed gas: air

Pressione assoluta di riferimento - Absolute reference pressure: 1013mbar (14.7psi)

Temperatura di riferimento - Ambient reference temperature: 20°C (68°F)

Funzionamento in vuoto: scarico atmosferico - Vacuum condition: atmospheric discharge

Funzionamento in pressione: aspirazione atmosferica - Pressure condition: atmospheric suction

Jurop SpA

via Crosera n° 50
 33082 Azzano Decimo, PN (Italia)

SECONDARY SHUT-OFF

COMPARTMENT

JETTER HOSE REEL

2X 600L SIDE MOUNTED
WATER PODS WITH
SNIFFERS SIGNAGE

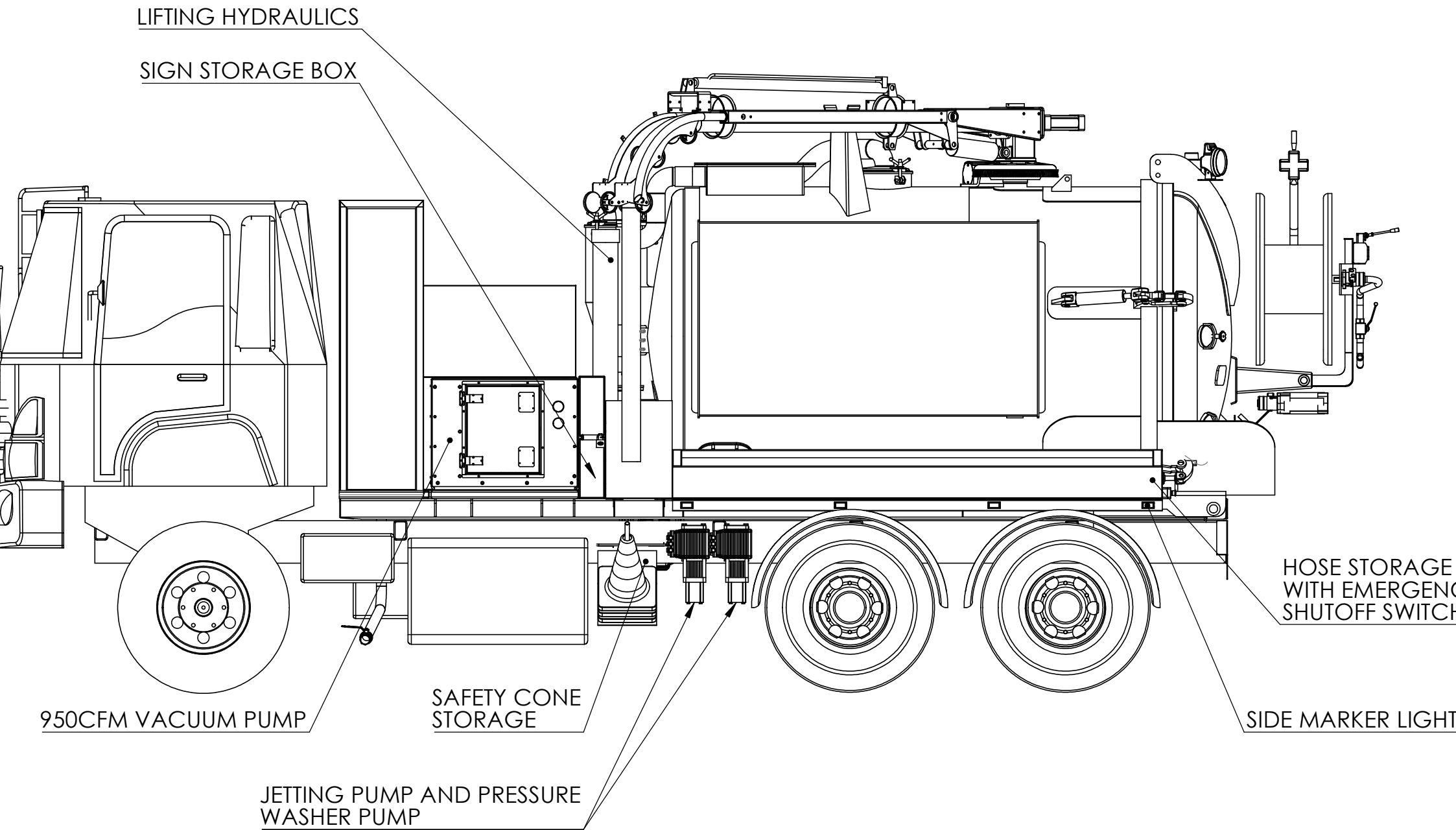
HYDRAULICS CONTROL BOX

DRILLING ATTACHMENT
STORAGE BOX

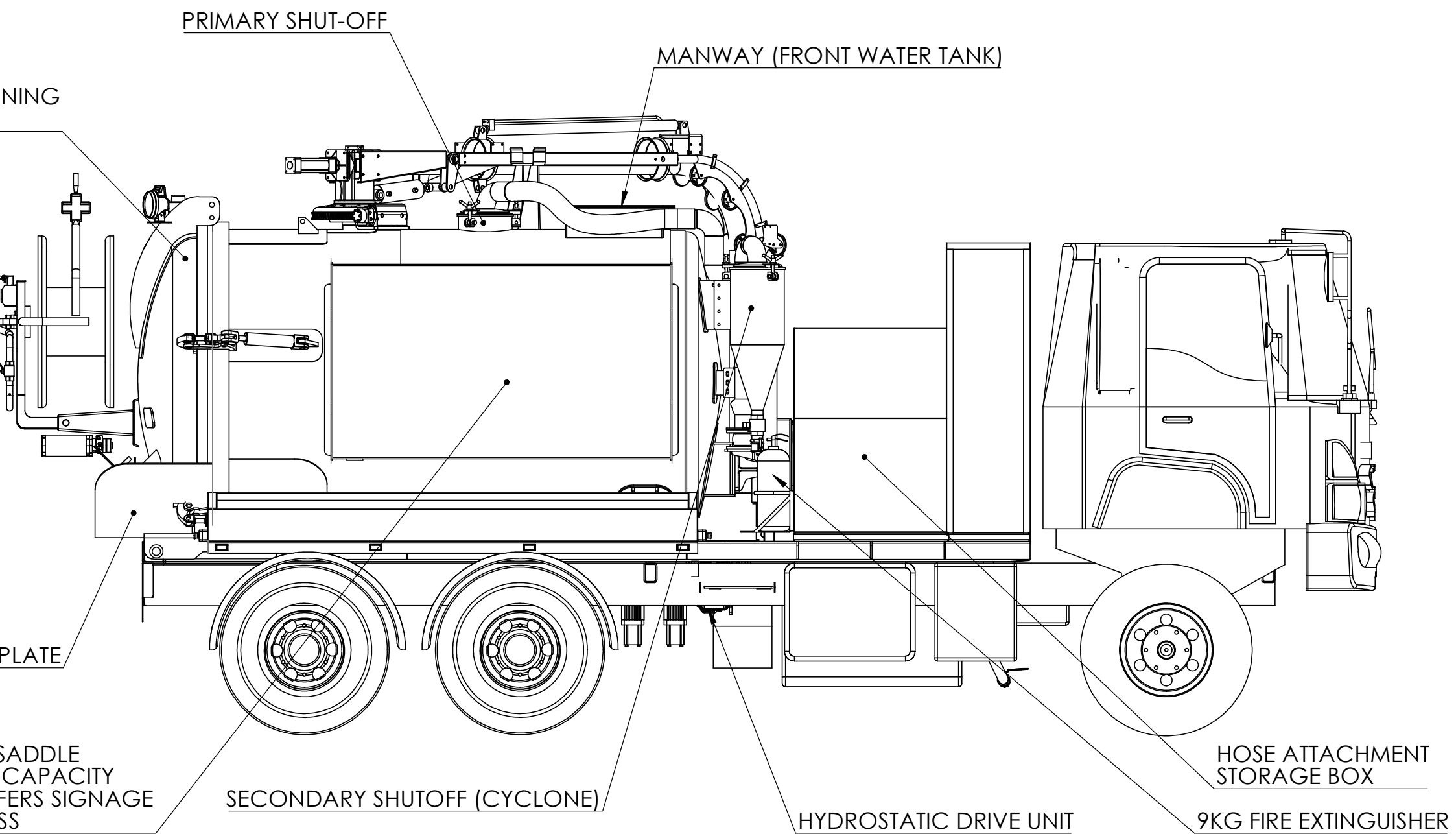
HOSE STORAGE DRAIN PIPE
WITH BALL VALVE

TANK CAPACITIES:
MAIN WATER: 2000L
REAR WASTE: 6000L
SIDE SADDLE TANKS

ISOMETRIC VIEW



PASSENGER SIDE VIEW



PRIMARY SHUT-OFF

MANWAY (FRONT WATER TANK)

NING

PLATE

SADDLE
CAPACITY
OFFERS SIGNAGE
SS

SECONDARY SHUTOFF (CYCLONE)

HYDROSTATIC DRIVE UNIT

HOSE ATTACHMENT
STORAGE BOX

9KG FIRE EXTINGUISHER

DRIVER SIDE VIEW