OPERATION GUIDELINES - 607 & 866 CHALLENGER VACUUM PUMPS

Keep it Cool

The Challenger vacuum pump is engineered, machined and assembled with very close tolerances and precision port timing. This allows the pump to maintain a high level of working vacuum. The built-in cooling system assists in this industry leading performance. It is important to keep these cooling systems working effectively.

Keep it clean. Vacuum pumps rely on heat radiating from them to keep cool. If mud gets packed on and around the vacuum pump the heat has trouble escaping. Make sure the pump is kept clean.

Fan cooled pumps require that the fan be secured and kept free of mud and debris.

Liquid cooled pumps require a free flow of anti-freeze through the pump water jacket, supplied from the coolest section of the engine cooling system.

When ballast port cooling is used, as in the case of the model 866, the ballast port filter and check valve must be kept clean and free of debris.

The factory installed thermometer should be monitored regularly. If an increase of temperature is detected, the pump cooling system should be checked.

Vane Wear

A rotary vane vacuum pump features an offset rotor spinning inside the housing. The centrifugal force causes the vanes to maintain contact with the inside surface of the housing. The vanes form a pocket which picks up (or pulls in) air on the intake side of the pump and forces the air out of the exhaust side of the pump as the vanes collapse into the rotor. Oil is used as both the lubricant for the vanes and to form a seal for the air pockets. Debris and excess heat can cause the vanes to hang up in the vane slots making them slap against the inside of the housing. This will cause a wash board effect to wear into the housing and will destroy the vacuum pump. It should be noted that the wash boarding can also be caused by under speeding the vacuum pump. Refer to the RPM setting and diesel flushing to eliminate the wash board wear. Ultimately vanes wear and need to be replaced periodically. This period depends on the hours, type of service and care.

The Challenger pump is equipped with a vane wear inspection port. Vane wear is dependent upon many factors, though under normal conditions they should last approximately 2,000 hours. A vane is worn to the point of replacement when it is 1/4" below the rotor surface.

The vanes we use in the Challenger pumps are made of a Kevlar material. When replacing vanes it is very important to use original equipment. There are vanes available in the after market, which contain Kevlar with fiberglass for reinforcement - ***these vanes will destroy the inside of your vacuum pump.***

Oil Catch Muffler

We manufacture the properly sized oil catch mufflers for the Challenger pumps. Those are available in a round canister style for remote mount or in the rectangle style, which is designed to attach to the pump mounting bracket. Our mufflers are fitted with a stainless steel mesh filter element, which both quiets the pump and filters the air under pressure applications.

In most of our models, the filter element is easily removable for cleaning and service, which should be done periodically.

The rectangular muffler comes standard with a deflector mounted in the exhaust stream, which can direct the exhaust towards the truck frame or the rear tires. **Alternatively, we can supply a fitting on the exhaust which can be used to plumb the exhaust away from the truck (very useful when pumping toxic gasses).**

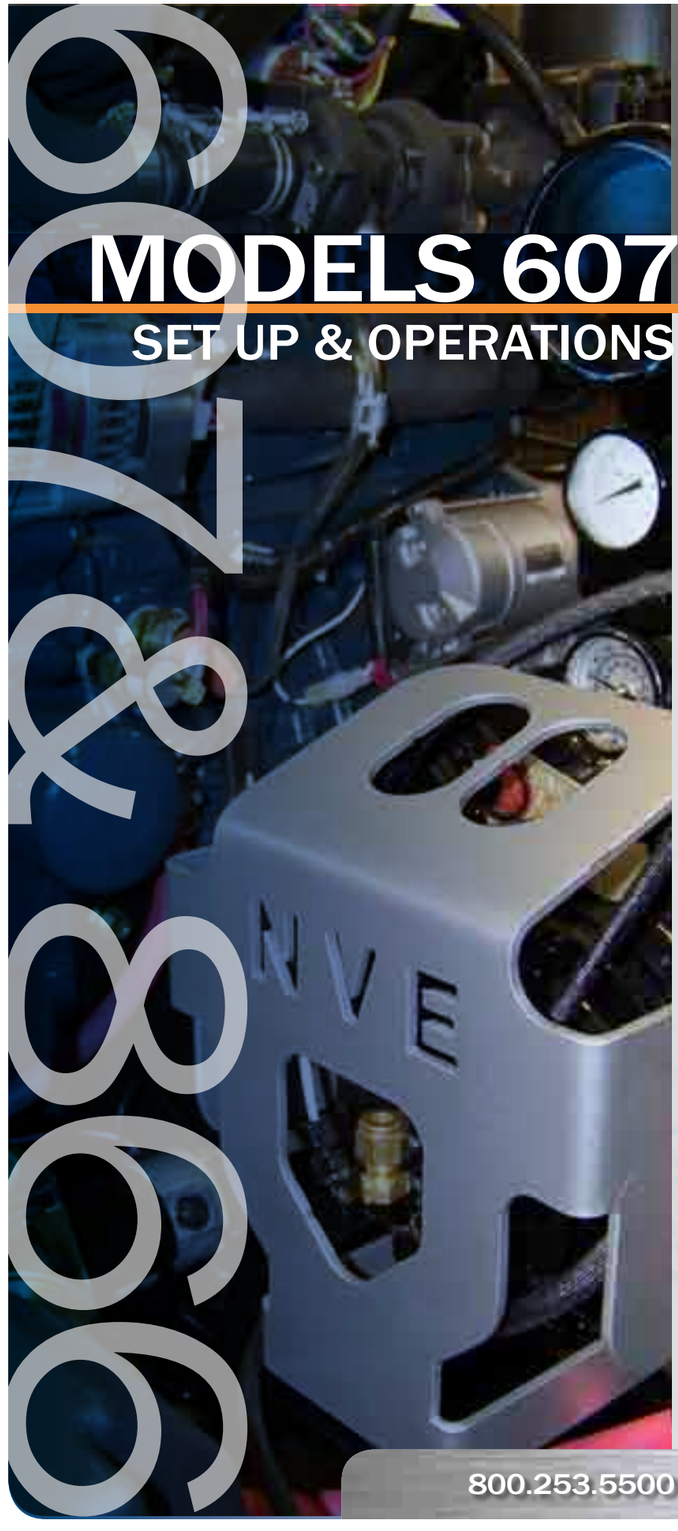
When properly setup and adequately maintained you will receive years of service from your Challenger pump. For questions and additional information please contact your dealer or NVE direct at 800.253.5500.

Thank you,

NVE

IMPORTANT

It is the responsibility of the final assembler to align gearbox, tighten all bolts, fittings, set screws, hose clamps, grease all zerks and bearings and make sure all guards are in place. Fill and or check level of oil in gearbox and remote oil tank. Ensure oil is pulsing through all lines on vacuum pump. Thoroughly test the vacuum system and components supplied by NVE prior to delivery of the final product to the end user. NVE will not be responsible for improper installation. To validate product warranty complete the Warranty Validation form. This form must be signed and dated by a qualified installation technician AND returned to NVE via fax 800-998-6834 or email to sales@natvac.com.



NVE

MODELS 607 & 866

SET UP & OPERATIONS GUIDE

NVE is the industry leader - with powerful engineering, manufacturing and customer service capabilities that are unmatched by the competition.

Challenger Vacuum Pumps & Pump Packages

Blowers & Blower Packages

Self Contained Pump Packages

Battioni Pagani Pumps & Packages

Rotary Lobe Blowers

NVE DOT Manufactured Valves

RIV Imported Valves

Vacuum Tank Components

Accessories

SET UP & OPERATIONS GUIDE

Challenger Series
VACUUM PUMPS & BLOWERS

RPM


The pump should operate between 1,000 and 1,250 RPM in the case of the 607 model and 850 - 1000 RPM for the 866 model. Running the pump too slow will cause the vanes to chatter wearing the housing unevenly and prematurely. Running the pump too fast will cause over heating.

Maximum RPMs as listed, are to be used ONLY for intermittent services when maximum air flow is required.

Do not rely on your engine tachometer for an accurate reading. RPM should be measured at the pump shaft.

Vacuum Relief


Rotary vane vacuum pumps cannot operate continuously at full vacuum, they must have adequate relief valves to keep them from overheating. The Challenger performs at the top duty cycle (working vacuum level) in its class. The duty cycle is dependent upon several variables, such as RPM, ambient temperatures, altitude, run time, cooling time, etc. The vacuum relief valve should be set so that during its longest pump job the vacuum pump temperature will not exceed 375 degrees. The Challenger pumps are fitted with exhaust temperature gauges for this purpose.

Vacuum is measured as inches of mercury on the vacuum/pressure gauge. Be sure your gauge registers zero before you start evacuating your tank.

The cooler the pump runs, the longer it will last so it is recommended that the pump be set at the maximum vacuum required, generally 21" for most jobs.

Since all vacuum tanks should be able to withstand full vacuum, the purpose of the vacuum relief valve is to protect the pump. Therefore the vacuum relief valve should be installed at or near the pump. The relief valve should be able to break vacuum at the pump even if both the primarily and secondary shut offs are engaged.

Pressure Relief


The pressure relief valve is generally installed in the tank for it's protection. This should be sufficient assuming it is set so the pump does not over heat.

Never run your vacuum pump under pressure with your valves closed. To set the pressure relief start with a valve fully open, slightly closing it until the pump creates the desired pressure. Then adjust the spring setting on the relief valve until the valve pops off. You should then be able to slowly close the discharge valve while the pressure level remains unchanged.

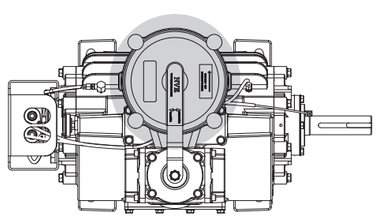
Drive Coupler
It is important to have a "break away" coupler insert to avoid catastrophic damage in the event the vacuum pump seizes. Improper alignment of the coupler will cause vibration and premature wear. Too much thrust pressure on the pump coupler can cause rotor to end-plate contact on the pump non-drive end.

Make sure the coupler is aligned properly and does not apply pressure on the end of the pump shaft.

The drive coupler should be sized for the most difficult work being performed. Typically the desired pressure will dictate the coupling size required.

Automatic transmission create the additional problem of significant start up torque. Though we would typically recommend hydraulic or belt drive with automatic transmissions, a standard gear box and coupler system will work with properly sized PTO and coupling set.

Setup Considerations
Make sure the vacuum pump is installed in such a way that the maintenance areas are accessible and full use of the four-way valve is available.



Oil System
We recommend a turbine 68-weight ISO oil for pump operation. Other types of oils can cause a varnishing inside the pump hampering the vane performance.

The oil level should be filled to the top of the tank daily. Normal operation should consume approximately 12-16 oz. of oil per hour of run time.

The oil tank and the vented oil fill cap should be drained and cleaned regularly as needed. Make sure the oil tank is always properly vented.

Diesel Flushing
A vacuum pump is designed to pump air only. Depending on the working conditions, the vacuum pump may pick up foreign debris, such as frac sand, soap and chemicals, various gases and even residual water. Any foreign matter inside the pump will hamper the performance of the vanes and can cause catastrophic failure. Diesel fuel can be introduced to the pump on a regular basis to keep the vanes and housing clean. The Challenger pump is fitted with a valve just below the final filter, which is designed to accommodate the diesel flush (please refer to your owners manual).
Alternatively the vacuum hose can be removed from the pump and a cup of diesel slowly poured in while the pump is running in neutral. After a minute or two move the handle to vacuum to expunge the fuel. Repeat as necessary.

Final Filter


Due to the harsh environment and pumping conditions it is necessary that your system include a final filter. The integral final filter included in the Challenger manifold filters the air under vacuum and pressure. This unit filters to .009", the closest in the industry. The filter must be cleaned on a regular basis depending on service.

The 866 model is cooled by injecting outside air into the exhaust side of the pump, called ballast port cooling. These systems have a filter which must also be maintained, the pump will overheat as this filter plugs.