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INSTRUCTIONS
MOUNTAIN MOTOR VACUUM PUMP

The Star Machine Mountain Motor Vacuum Pump is specifically designed to satisfy vacuum requirements in engine applications where flow requirements exceed traditional vacuum pumps. These applications include large CID's, and engines using enhancements such as Nitrous Oxide, superchargers or turbochargers.

MOUNTING THE PUMP

NEVER MOUNT THE PUMP BY CLAMPING AROUND THE DIAMETER!

All effort should be made to utilize the Star Machine gold anodized mounting bracket. Use all ten (10) screws provided with the bracket to secure the pump to the mounting bracket. The mounting bracket should be positioned to allow for proper belt tensioning. The pump should be mounted with the tubes facing straight up when possible for optimum pump performance.

DRIVING THE PUMP

There are many pulley/belt tooth configurations available today. We have chosen one of the most commonly found on race cars with .50" wide x .375" (L) pitch belts and pulleys. You may use another style as long as you follow the recommended ratios.

If you chose to change the pulley on the Pump, you **MUST** use the pulley thrust cap delivered with your pump! This requires the use of a pulley (or pulley and spacer) with a combined hub width of .85" to .80" to ensure that the thrust cap will not bottom out on the shaft face. Use ONLY ONE set screw, directly over the key. Tighten the thrust cap first, then the set screw.

PUMP DRIVE RATIOS & VACUUM REGULATION

Satisfactory results can be realized by turning this pump much slower than traditional vacuum pumps. Ideal speeds are in the 3000-3500 RPM range. The maximum recommended pump RPM is 3975. The factors used to determine the ideal drive ratio are engine displacement, engine RPM range, the presence of enhancements that increases blow-bye and the amount of vacuum desired. Excessive Pump speeds that develop excessive levels of vacuum could be detrimental. Although slower Pump speeds will alleviate this condition, it could create a disadvantage at low RPM's, especially in cars using automatic transmissions.

Star Machine recommends the use of a vacuum regulator on most engines to address this condition. The red anodized plate contains a port for a vacuum regulator. The port is plugged off if a regulator is not used. The regulator can be set at an ideal vacuum level for your particular application, insuring that vacuum levels will not exceed helpful limits. Automatic transmission equipped cars may benefit from the use of a check valve. The check valve will help to maintain vacuum levels developed during the burnout process that may otherwise escape through the Pump due to low engine RPM's during the staging process.

PLUMBING THE PUMP

Two hose/regulator mounting plates are available for this pump; one for ¾" hose and one for 1" hose. They should be specified when ordering the pump, but can be easily swapped later. The same considerations should be given to plumbing the Vacuum Pump as you would when plumbing your fuel system. Keep the hose lengths as short as possible. Never use right angle fittings. Free flowing, large radius bends are best. The use of springs inside of a hose to prevent from collapsing will disrupt airflow and may become loose and be drawn into the Pump. We recommend (and have available) a see-thru hose designed specifically for high vacuum systems. This clear hose will also give you an early indication if oil is being drawn out of the engine and into the Pump.

OPTIMIZING PERFORMANCE

The most overlooked aspect of successful crankcase vacuum is excessive leakage due to poor gaskets and seals and excessive blow-bye. The ideal drive ratio can NEVER be achieved if excess pump speed is necessary to overcome leaks. Even the most careful engine assemblers can take for granted areas they never thought to be a problem. Pressure testing the engine for leakage must be done if optimum results are to be realized. Unlike fuel or coolant leaks that are obvious to the eye, vacuum leaks are not visible and consequently assumed to be nonexistent.

THINGS TO AVOID

***Oil in the Pump:**

The Pump is a "OIL-LESS" design, which requires NO LUBRICATION for operation. Oil in the Pump will not damage the Pump, however it will reduce its performance. The **dryer** you can keep this Pump, the **better** it will work! The use of a baffle is mandatory! This may require several modifications to the location and design of the baffle you draw vacuum from. How will you know if oil is in the pump? If you use clear hose and the hose shows signs of oil in it, the oil will be in the Pump also. If you remove the belt from the Pump and spin it by hand and you do not hear the vanes tapping (as they are flung from the rotor) you have oil in the Pump. To clean the oil from the Pump, remove the hose from the intake side of the Pump and spray nonflammable (environmentally safe) solvent into the intake tube with the engine running. Mind the Pump exhaust when doing this! You should make this part of your usual race car maintenance.

Excessive oil in the pump is a clear indication of a failed seal or gasket or excessive blow-bye.

***Dirt in the Pump:**

During installation and storage put the caps supplied (or tape) over the intake and exhaust tubes.

***Touching the Pump after a run:**

As a result of friction, heated intake air and the compression of the air within the Pump, it will be VERY HOT (250+ F).

***Artificially cooling the Pump:**

Do not blow air, place ice packs or pour water on the Pump to cool it.

ALLOW THE PUMP TO COOL NATURALLY