



TROUBLESHOOTING GUIDE Power Steering System

305 Dee Cee Court • White House, TN 37188 • Ph: 615-672-5117 • Web: www.kse-racing.com

POWER STEERING SYSTEM OVERVIEW

KSE's Power Steering Pumps and Tandem Pumps (PS+Fuel) have been proven to give excellent power steering performance under racing conditions for various applications including sprint cars, modifieds, and late models. KSE's power steering pumps work well with stock power steering gears (i.e. Saginaw), power rack & pinions, and various aftermarket units. All of KSE's power steering pumps are specially designed positive displacement gerotor-style pumps which can be characterized by their high mechanical and volumetric efficiencies with smooth flow and low pulse ripple. It is important to note that a positive displacement pump (vane, gerotor, gear, etc.) creates flow, not pressure – pressure is only a signal of the resistance to flow!

When troubleshooting any power steering system, it is always important to remember that there are many components and/or factors which can affect the performance of the system, including:

- Power Steering Gear / Rack & Pinion
- Power Steering Pump
- Power Steering Fluid & Reservoir
- Plumbing – Hoses & Fittings
- Steering Geometry & Tire Scrub
- Steering Ratio - Linkage & Steering Quickener

Notably, the two most commonly overlooked items in this list (which account for a large majority of all power steering issues) are the power steering fluid reservoir and the power steering plumbing – namely the pump suction line. A well designed power steering fluid reservoir should have these features:

- The tank must be vented (i.e. vented cap). A non-vented tank will cause pump seal failure.
- Should be tall in shape and hold a minimum of 16 oz. of fluid.
- Should have baffling to defuse fluid turbulence.
- Returning fluid should enter below fluid level.
- Should be made of aluminum or good heat conductive material.
- A filtered system will increase the life of all system components.

The suction line to the inlet of the pump should be a minimum #10 (3/4" ID) line. This hose must be vacuum rated to 20 IN HG in order to minimize the potential for hose collapse. Proper care should be taken to assure that the hose is not cut, rubbing, or pinched which could cause hose failure. The fittings need to be inspected in order to verify that they are free of scratches, dents, or dings that could cause air to be pulled into the system. If push-lock hose ends are used, hose clamps are highly recommended.

The pressure line from the pump to the steering gear should be a minimum #6 (3/8" ID) line. This hose must have a minimum 2000 psi working pressure with a 6000 psi burst rating. The return line from the steering gear to the reservoir should be a minimum #6 (3/8" ID) line. This hose should have a minimum 100 psi working pressure with a 300 psi burst rating.

The pump's performance can be best determined by a flow-pressure test which requires specialized equipment for assuring proper flow capabilities. KSE's standard pump test specifications are as follows:

- Output Flow @ 3600 Pump RPM – 5 GPM (minimum at zero load)
- Output Pressure @ 1700 Pump RPM – 1100 psi (minimum relief setpoint)

WARNING: When testing the power steering section of a KSE Tandem Pump, clean oil or fuel must be pumped by the fuel section. Running a pump dry can result in severe pump damage.



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STEERING HARD ALL THE TIME

<u>CAUSE</u>	<u>SOLUTION</u>
LOW FLUID LEVEL	ADD FLUID
PUMP SPEED TOO LOW	CORRECT TO 50% OF ENGINE RPM (CONFIRM PULLEY RATIO i.e. 40/20 TEETH)
RELIEF VALVE STUCK OR DAMAGED	REMOVE AND INSPECT
STEERING GEAR DEFECTIVE	REPAIR OR REPLACE STEERING GEAR
PUMP DEFECTIVE	REPAIR OR REPLACE PUMP

STEERING HARD AFTER WARMED UP

<u>CAUSE</u>	<u>SOLUTION</u>
AERATED FLUID (CAVITATION)	HOSE OR FITTING FROM RESERVOIR TO PUMP DEFECTIVE, AIR LEAK OR RESTRICTED RESERVOIR NOT VENTED INADEQUATE RESERVOIR DESIGN LOW FLUID LEVEL RESTRICTED FILTER, IF USED
STEERING SYSTEM OVERHEATED	INADEQUATE RESERVOIR DESIGN
POOR FLUID QUALITY	USE KSE ELIXIR, PART# KSM1086
PUMP DEFECTIVE	REPAIR OR REPLACE PUMP
STEERING GEAR DEFECTIVE	REPAIR OR REPLACE STEERING GEAR



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**STEERING HARD LOW SPEED
BELOW 2500 ENGINE RPM MAYBE NORMAL**

<u>CAUSE</u>	<u>SOLUTION</u>
ENGINE STALLED (HARD BRAKING)	NONE
AERATED FLUID (CAVITATION)	HOSE OR FITTINGS FROM RESERVOIR TO PUMP DEFECTIVE AIR LEAK OR RESTRICTED RESTRICTED FILTER, IF USED RESERVOIR NOT VENTED LOW FLUID LEVEL
STEERING SYSTEM OVERHEATED	INADEQUATE RESERVOIR
POOR FLUID QUALITY	USE KSE ELIXIR, PART# KSM1086
STEERING GEAR DEFECTIVE	REPAIR OR REPLACE GEAR
STEERING LOADS TOO HIGH	PITMAN ARM LENGTH (REDUCE LENGTH TO SLOW DOWN RATIO) HIGH CASTER ANGLE BIND UP IN STEERING LINKAGE EXCESSIVE TIRE SCRUB
STEERING COMPONENT BIND UP	KING PIN, DRAG LINK, TIE ROD, FRONT GEOMETRY
PUMP DEFECTIVE	REPAIR OR REPLACE PUMP

PUMP HAS REPEATED SEAL LEAK PROBLEMS

<u>CAUSE</u>	<u>SOLUTION</u>
NON VENTED RESERVOIR	VENT CAP OR RESERVOIR
FLUID INADEQUATE	USE KSE ELIXIR, PART# KSM1086
PUMP DEFECTIVE	REPAIR OR REPLACE PUMP

TECH SUPPORT HOTLINE: 1-800-443-3562
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