

KS8 Vehicle Dynamics Part Review

Thursday, July 24, 2025 7:59 PM

Wheels:

- A lot of them are bent
- Need to reseal year to year

Wheel inserts:

- Cracking around hole
- Alignment feature needs to be revisited
 - Chamfer is mated to hubs
- Clearance to get a tool around the Lug nuts

Wheel Hubs:

- Recheck brake rotor mounting
 - Hole pattern was machined off on the KS8
- Tension cap hole depth and recheck target tension
 - Needed very specific fasteners for all of them
- Stud press fit needs to be rechecked

Front Uprights:

- Heavy (+0.5 lbs.)
- Lightweight pattern was easier to machine, can thin the walls
- During machining, Could not fit a tool on the inside of the steering pickup face
- Check upper control and hub offsets
 - Bolts for the upper mount would hit the rotor
- Increase the size of the upright pickup
- Lower control arm pickup, interfered with the lower control arm
- Wheel bearing tolerances were not clear?
 - Sometimes the bearing would stick to the hub when pressing it out

Rear Uprights:

- Rear upper control arms had clearance problems to the control arms
- Wheel speed mounting is not as rigid
- Investigate tool access for the lower control arm, camber adjustment

Control Arms:

- Pushrod was welded slightly too tall on the control arm, would hit toe rod in the middle of steering
- Spherical tolerances weren't consistent on the spherical cups
- Control arms could be warped, was hard to mount onto the car
 - Recheck the control arm jig
- Reorder the tubing coped

Brake buttons:

- Steel ones never got made
- All had to be sanded down to fit onto the messed up hub mounting
- Could be smaller
- No tolerancing between the interface of the hub rotor mount, brake rotor, and brake button

Brake Rotor:

- All non-uniform thickness

- They all currently drag
- Have been resurfaced multiple times
- Had to make diameters for some of the mating features larger

Brake Caliper:

- Seem mostly fine
- Getting up there in age

Brake hardware:

- Quick disconnect for the pedal box, outboard wheel assemblies
- Ended up with the wrong hardware for the calipers
- Ran out of brake line fittings during the year

Suspension Linkages:

- Toe shim count would change throughout the year for the neutral setting of the car
- Need to replace rod ends for all the linkages
- Move push rods and toe rods to spherical with a jack screw

Bell Crank:

- Rear bell crank almost hits push rod
- Front and rear can't currently mount an ARB
- Wall is too thin, outsides of the bell crank would bend inward when torqued
- Front mounting of the tab to chassis still not even across left and right
- Still a lot of compliance side to side of the entire articulation

Dampers:

- Rear dampers upper mounting to yoke plate, very close to the body of the damper and needed a spacer to mount to bolt hole
- Still hard to adjust the preload at the rear of the ecar
- left rear of IC damper, bad after endurance
- Shock dyno did not look great on the car
 - Rebuild and redyno

Steering:

- Need new quick connect hub
 - Slop is getting very high
- Need a jig to get correct angles when welding in the steering rack mount as well as the steering hoop of the frame
- Close to the rule of the highest point of the steering wheel and the main hoop height
- Steering sensor was below the lowest point

Frame - Front:

- Needed to add the extra tube to meet side impact structure
- Could have played with the suspension mounting to optimize more for weight
- Different bell crank mounting could help consolidate the tubes
- Had to widen the pedal box tabs because the front of the chassis got wider

Frame- Middle:

- Make it wider, so *drivers* can fit
- Across articulation for steering was still a problem
- Relocating some of the data acq. Stuff behind the seat
- Clearance for firewall to the accu lid was very close
- Floor pan under the driver is unoptimized, 6 tabs almost

- Seat belt mounting
 - o Tech judge wanted the sub belt mounting to be flat to the floor so it could come under the drivers legs (in-plane to the floor)

Frame - Rear:

- Add paneling to the side of the car and maybe across top of accumulator for rain
- The shape of the frame around the accumulator isn't optimized for weight or stiffness, the box is very basic and made to make the accumulator easy
- Had to grind down the motor mount tabs because the rear of the frame was too small
- Rear of the frame lifted, rear sprocket was close to the tubing
 - o Space for the rear sprocket

Frame - overall:

- Stiffness targets are not justified
- Start measuring up the suspension nodes
- Motor jig was warped after the printer
- 3D printing blocks to hold the accumulator in height would be fine for jigging to the car
- More suspension jigs
 - o Use to have waterjet ones for the bell crank and damper

Yoke Plate:

- Suspension clearances across control arms and diff housings were very close
- Rear sprocket was very close to the bottom of the yoke plate cutout
 - o Can't run the larger rear sprocket on the car
- Could reduce mass by removing the need for the plate and going different concept
- Slot clearance for the bolts on the rear sprocket is very small

VD Notes

Wednesday, September 10, 2025 6:29 PM

One small step for man:

- What is the purpose for the redesign of the rear end?
 - o Criteria and how much of each
- Why would these things beat the current setup and by how much would they beat it?
 - o Do they justify manufacturing timeline?

Mumbai motorsports:

- Do these criteria fit within a subgroups goals for weight that was described in previous SRR goals
 - o By how much do they fit
 - o When do you want these projects to get finished and how will they inhibit or promote the submission for other projects