SR4

Radical Owners Manual

Radical Sportscars

SR4

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Dear Radical Owner

Many thanks for purchasing a Radical SR4 sportscar.

Whether you intend running your car at trackdays, entering it in sprints and hillclimbs, or competing in the wide range of circuit racing available to you, one thing remains constant. A well-maintained and prepared sportscar will ensure that you get the maximum performance and reliability that Radical is renowned for the world over.

Radicals have covered hundreds of thousands of trackday, test day and racing miles. This manual highlights many of the lessons and tips we have learned. Do not start your car until you have read it.

Your Radical has been designed with one objective – to give you the ultimate driving pleasure!

Happy driving

Mick Hyde

Mick Hyde.
For Radical Motorsport Ltd

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RADICALS HAVE COVERED HUNDREDS OF THOUSANDS OF TRACKDAY, TEST DAY AND RACING MILES. THIS MANUAL HIGHLIGHTS MANY OF THE LESSONS AND TIPS WE HAVE LEARNED. DO NOT START YOUR CAR UNTIL YOU HAVE READ IT. 2

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Preparation for Shake-Down

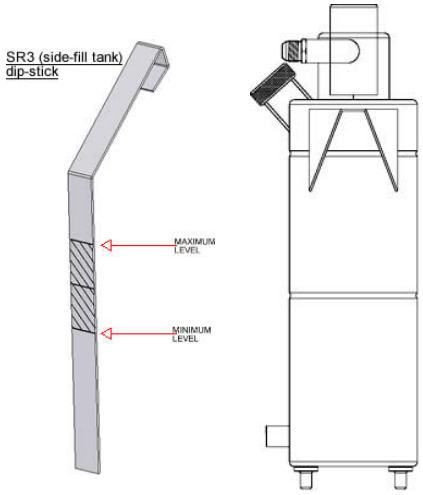
Before taking to the track, it is important that you carry out a thorough spanner check, paying particular attention to all hoses, connections and suspension fixings, brake bias etc..

Check all fluid levels

The oil level on cars fitted with the **standard wet sump** should be *no lower* than three quarters up the sight-glass, with the car on level ground and the *motor warm and running*. The sump is baffled and the oil takes some time to settle.

NB: Some wet sump engines are fitted with a dip stick to aid checking oil levels.

For cars fitted with a **dry sump system** the oil level must be maintained just above the top baffle in the oil tank (100mm down from the top of the tank). This measurement should be taken when the engine is warm and running. The sight glass in the side of the engine should be ignored. NB – a dip stick is available to aid checking the oil level.



Only use Radical recommended oil, i.e. Silkolene Pro 4 synthetic-based racing oil, which is formulated to run in the integral gearbox, and clutch as well as the engine (see running in).

Warning

Do not rev the engine more than 4,000rpm (one yellow light on the dash) until the oil is warm. When cold the oil can run at 100psi, which may damage the oil cooler.

In the brake and clutch master cylinders, use only high temperature racing brake fluid.

The engine cooling system uses a 50/50 anti-freeze / water mixture. The level should be to the top of the swirl pot.

Driving Position

The combined driver and passenger seat may be adjusted forward and backward to suit individual drivers. Please note: The seat belt crutch strap will also need adjusting.

The position of the pedals can also be adjusted by a) adjusting the pedal face, b) adjusting the pedal angle and c) by moving the pedal pivot shaft. Please note that c) will require changing the master cylinder push-rods.

Manual Sequential Gear Change

The SR4 is usually supplied with the gear selection set to "*pull back on the gear lever to shift up the box*" and "*push forward to shift down the box*". By moving the gear linkage rose joint from the lower fulcrum to the upper fulcrum in the engine bay, the gearshift direction will be reversed.

If your SR4 is fitted with a Powertec PS1 pneumatic power shifter, please refer to the separate manufacturers operating instructions.

Starting The Engine

Motors with flat-slide carbs – depress the throttle fully 2-3 times, then depress it a small amount and start the engine. Allow the engine to warm before depressing throttle further.

Motors with electronic fuel injection - Start the engine with the throttle closed. To start the engine when the engine is warm, depress the throttle a small amount before starting the engine.

WARNING

The starter clutch may be damaged if the engine is turned over slowly. Only start with fully charged battery, or battery jumper kit

Power Seating

After the motor has been brought to working temperature, it should be driven off, short shifting through the gearbox until you are in top gear. Drop the speed down to the lowest it will reasonably pull away in top gear. Then accelerate hard for a few seconds and then snap shut the throttle and coast for a few seconds. Do this fifteen times as a minimum. Accelerating hard, but only using low revs, pushes the rings hard onto the bores. By then snapping shut the throttle, oil is then dragged up to wash the bores clean. Keeping the revs low will eliminate the chance of glazing the bores.

Running-In

Now the motor needs to be run in for at least two hours. You must not use more than 80% of the engine revs. Vary the speed, short shift, and do not hold it at constant revs. The engine is supplied from the factory with mineral oil for running-in purposes.

Change to Radical-recommended synthetic based racing oil when running-in is complete.

Watch the temperature and pressure gauges, return to the pits regularly, and thoroughly check all hose fittings for leaks.

Running the Engine

Do not run the engine under load if:-

a) oil temperature is below 60°C
b) oil temperature is above 120°C
c) water temperature is below 60°C
d) water temperature is above 100°C
e) oil pressure when up to temperature at 4000rpm is under 50psi.

The oil pressure when the engine is started should run at 90psi at 4000rpm when up to temperature the oil pressure should read 60psi at 4000rpm.

Maximum engine revs:- 10,500rpm

If over-revved from 11,000rpm – 12,000rpm for more than 2 seconds per hour, in any 1 hour of operation the engine will require stripping for inspection and repair, at the customers cost, prior to any further running. (Any over-rev will be recorded on a data logger or ECU histogram, if fitted.)

The rev limiter is set to 10,500rpm. Persistent use of the rev limiter will damage the engine.

It is important to log the number of hours the engine is run. The engine should run for no more than 30 racing hours before being returned to the factory for a rebuild. If the engine is stressed less (i.e. trackday or road use) the car should be returned to the factory every 30 hours for a rolling road dynamometer test. Engines which are not raced, regularly cover 90 hours without requiring attention.

Bedding-In Brakes

The car comes fitted with carbon metallic brake pads. To bed in the brakes and achieve maximum stopping power, a film of carbon must be transferred to the discs

Gently apply brakes 6 to 8 times at medium speed. Increase speed to simulate race conditions, and apply brakes hard a further 6 to 8 times.

Allow brakes to cool for 15 minutes. Do not apply brakes whilst stationary during cooling down period.

Use only Radical recommended brake pads.

Fuel

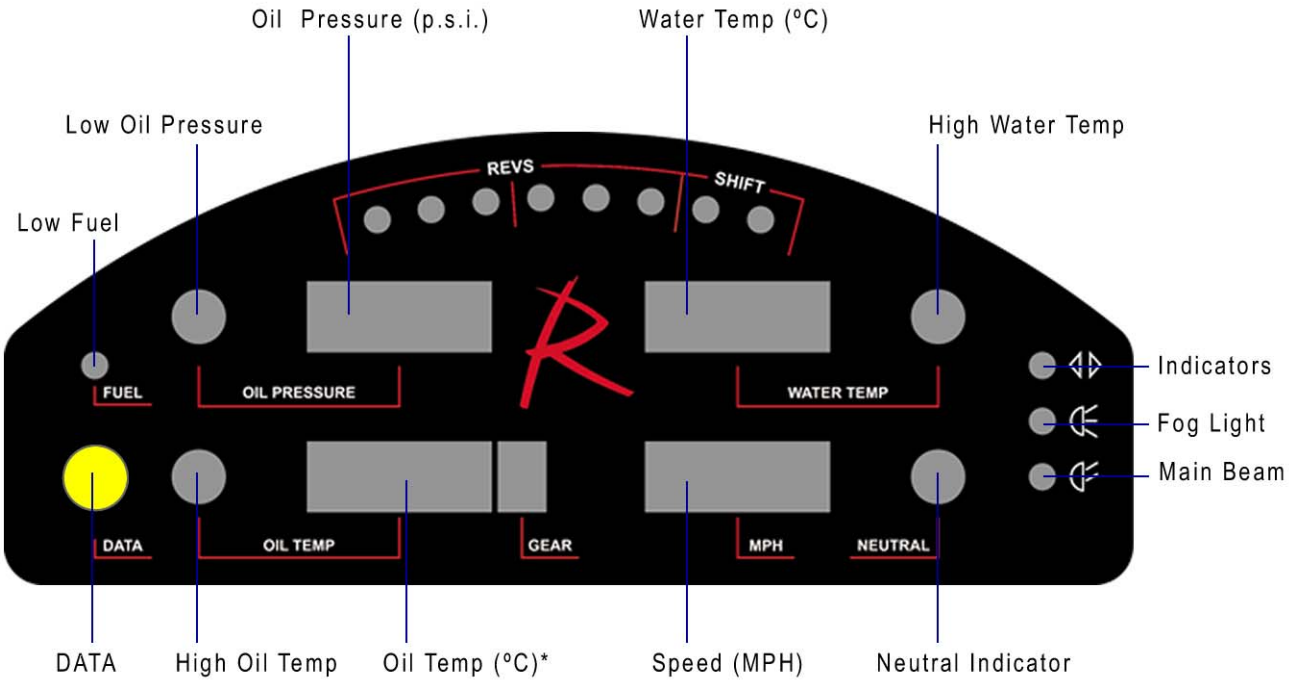
Standard Powertec Kawasaki 1200 and Powertec Suzuki 1300 engines may run on 95 octane regular fuel. Tuned Powertec Suzuki 1300, 1400 & 1500 engines should only be run on Super Unleaded 98 octane, or 100 octane race fuel.

Tuned engines in the USA should only be run on racing fuel such as cam2, or a minimum of 108 octane. We do **NOT** recommend mixing octane boosters with pump fuel.

Recommendation

The fuel filter should be changed after the cars initial outing. It is located to the right-hand side of the engine, under the top chassis rail.

Dashboard



Rev Indicator Lights

Yellow 4 – 5 – 6, Green 7 – 8 – 9, Red 10 - 10½
* Temperatures are not displayed until the fluids reach 45ºC.

When ignition is switched on, the dash runs through a test display.

High temperatures or low pressures will trigger a large warning light adjacent to the gauge it is indicating.

With the ignition switched on, press the data button to show maximum revs recorded to date (last two digits not shown). (The maximum recorded revs display may be reset by the factory, or by an approved Radical distributor.)

For cars fitted with steering wheel-mounted dashes / data loggers, please refer to the manufacturers manual.

Chain

Lubricate chain lightly before every run. i.e. every half an hour. Use a Radical-approved, synthetic chain spray lubricant.

Chain tension should be set at ½"-¾" of play at extremes of movement. Tension should be measured at three points around the sprocket circumference to check for tight spots.

Chain alignment should be checked using a straight edge placed on the face of the rear sprocket, and lined-up with the front sprocket.

If the chain is lubricated, tensioned and aligned correctly, it will give many trouble-free racing miles.

Note: As a precaution, it is recommended that the chain be replaced after twelve hours of racing miles. Only replace with a high-strength Radical chain.

Reversing Differential

To engage reverse gear, first put the car into 1st gear and then engage reverse by pulling backwards on the lever to the right of the driver. Press the throttle and release the clutch to reverse. Push the lever forwards to re-engage the forward drive.

Warning.

- Do not leave the car in reverse. You may have an embarrassing moment when you next drive the car.
- Do not reverse fast, or for long periods of time, you risk damaging the differential.

Centre-Lock Hub Nuts

Anodised **RED** for left-hand side,
Anodised **BLUE** for right-hand side.
Torque Setting – 200 ft lbs

Air Jacks

Cars fitted with air jacks are supplied with an air lance, which is inserted into a valve at the rear of the car. The lance requires connection to a bottled air supply, and the pressure should be regulated to 250-300lb

Suspension Guide – Dry Setup

The car is set up at the factory but, the final settings should be arrived at by testing for the particular driver's preference and the particular circuit. Try to check the tyre temperatures for balance across the contact patch within one minute of a fast lap. The inside edge can be 10°-15° higher than the outer edge on radial ply slick tyres (measured 1-2mm inside the tread ply, NOT on the surface).

Front:

Ride Height:	70mm	
Splitter height:	40mm (minimum)	
Pre-load (no. of turns)	0 (splitter)	
	6 (diffuser)	
Shock settings:	Avo:	6
	Intrax:	centre of range
Tyre pressure:	Hot:	20psi
	Cold:	14-16psi
Spring rate	6" × 300lb	
Camber	-2½° to -3½°	
Toe in:	2mm - 3mm overall	
Nik-link:	Medium	

Rear:

Ride Height:	70mm	
Diffuser Height:	40mm (minimum)	
Pre-load (no. of turns)	0	
Shock settings:	Avo:	8
	Intrax:	centre of range
Tyre pressure:	Hot:	20psi
	Cold:	14-16psi
Spring rate	6" × 350lb	
Camber	-2° to -3°	
Toe in:	2mm - 3mm	
Nik-link:	medium	

Note: Measure the ride height at front of chassis and the rear, at the rear seat back bulkhead, (below rollover bar) with the driver seated and three gallons of fuel in the tank.

Ride Height

The ride height may need increasing when carrying a passenger. The ride height may be increased to 100mm at the splitter, by adjusting the spring platforms. A "high ride height" front splitter and side skirt will be required to achieve the 100mm maximum ride height."

Brake Bias Settings

Set central to two turns towards front (clockwise on the dash adjuster). Further adjustment can be made to suit individual circuits and tyre configurations. Adjust bias to the rear in wet conditions.

Corner weights

For maximum performance, the Radical should have the corner weights accurately set with the driver in situ. The procedure is as follows:-

1. Position the car on a flat, horizontal surface.
2. Equalise all tyre pressures to hot setting, say 20 psi.
3. Take all readings with driver in car, or equivalent weight in the seat.
4. Remove bolt from one end of the front and rear Nik-Link, and adjust shocks to full soft.
5. Set ride height front & rear, then camber front & rear and finally toe-in front & rear.
6. Put car on weight scales, and set corner weights by adjusting spring platforms*. It is usually difficult to achieve identical settings on each corner to within 10%. Ensure that the sum of the diagonal weights are as near as possible.

   * When using pre-load, adjustable push rods are used to set ride height and corner weights
7. Re-check ride height and splitter height with the body on.
8. Lock spring platforms.
9. Refit Nik-Links, rear anti-roll bars, reset shocks, remove driver or similar weight, and reduce tyre pressures.
10. You are now ready to "rock & roll".

    Note: If you intend carrying a passenger for the majority of the time, the above procedure should be carried out with him/her in the car.

General Car Preparation

To keep your Radical looking at its best the fibreglass and carbon fibre items can be quickly and effectively cleaned with polish, while all chassis, suspension and panel parts can be kept looking new and corrosion-free by wiping them down with a cloth sprayed with WD40.

Driving Technique

If you are unfamiliar with a sequential shift car, it is recommended that you change gear using the clutch when going both up and down the gearbox. Once you have become familiar with the technique, changing gear going up the box can be achieved by lifting the throttle slightly and simultaneously 'snicking' the gear in, without depressing the clutch. On down-changes it is imperative the driver depresses the clutch and raises the engine speed before engaging the gear. Smooth gear changes can be best achieved by using the 'heel and toe technique'. Only change down one gear at a time.

As with any dog-engagement gearbox, aggressive gearchanges will damage the gear dogs which will result in gear engagement problems. Only use a maximum of 7,000–8,000rpm while getting used to driving your SR4. If you accidentally down-change instead of an up-change you are less likely to over-rev the engine. If you do over-rev the engine, make your way slowly back to the pits and use the yellow data recall button on the dash to check the maximum revs recorded. If you have revved the engine over 12,000rpm return the engine to Powertec for inspection immediately.

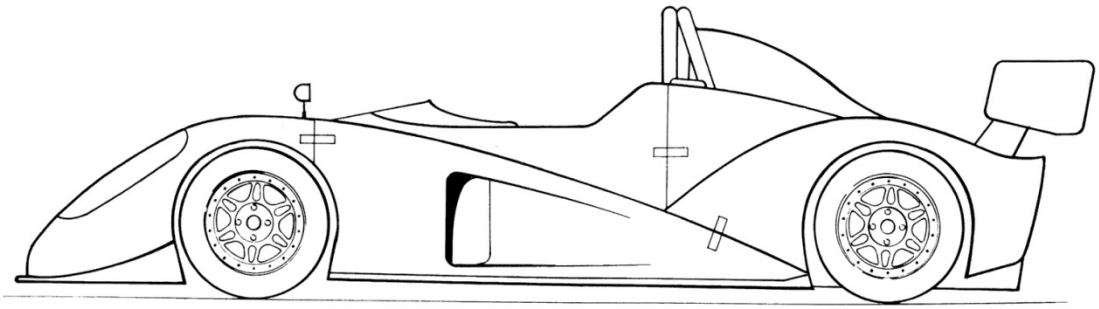
Ensure that the tyres and brakes are fully up to temperature before pushing hard.

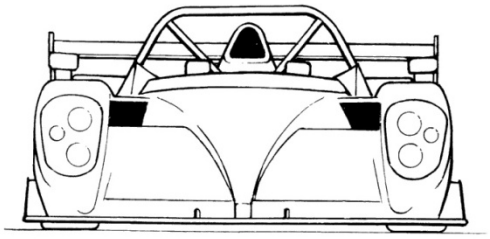
The Radical SR4 has phenomenal braking performance and will carry considerable speed into a corner. Practice braking hard, but come off the brakes smoothly and concentrate on carrying speed into a corner. On exiting the corner, the throttle should be fed in progressively.

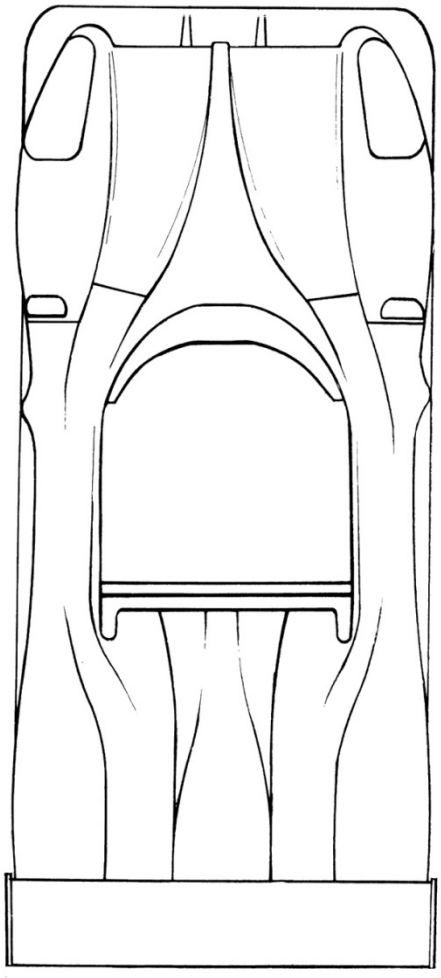
Driving smoothly is the secret to quick lap times.

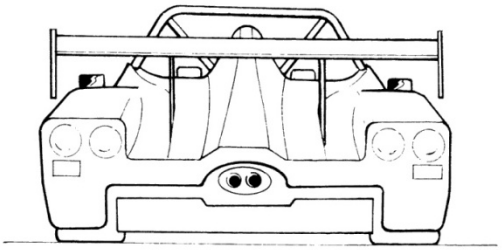
One final tip: **CHECK YOUR OIL LEVEL!** The SR4 can pull over 2.5g when cornering. If you do not have the correct oil level, even with a dry sump motor, you risk starving the engine of oil, with expensive consequences.

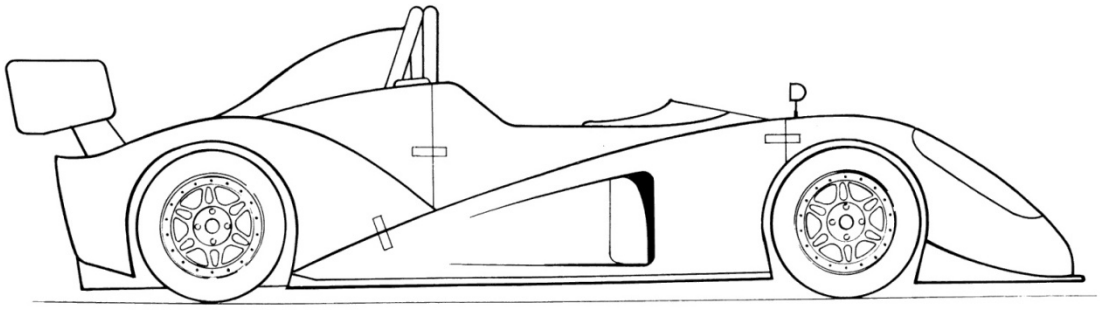
SR4 Decal Design Sheet











Race / Test History

Date	Circuit	Conditions	Qual. Posn	Fastest Lap Time	Result	Time on Circuit
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Component 'Lifing' Chart –

As the performance of our cars increases and the number of hours racing the cars complete grows, we are able to more accurately predict the lifespan of a car's components. Please see below, the revised 'Radical Component Lifespan Chart'.

The chart gives the recommended life expectancy of components under 'normal, on-track racing conditions'. If some of your racing time is done 'off-track' or you hit kerbs, pot holes or other cars – hard, then you will need to considering reducing the timescales recommended. On the other hand, more 'gentle' trackday use will obviously extend the recommended time!

One new addition to the list is the wing support stays, the life of these is greatly shortened if the wing is used to push, and particularly pull the car around in the pit lane, garages and trucks. It works perfectly to support the wing and the downforce generated in the direction intended, and not at an angle to the centre-line of the vehicle.

Component	Hours	Action
Engine	30	Rebuild
Gearbox	30	Inspect/rebuild
Chain	10	Replace
Suspension Bushes	50	Replace
Suspension Rose Joint	30	Replace
Front Upright Including Hub	90	Replace
Front Wishbones	90	Inspect/replace
Rear Upright	90	Replace
Rear Hub	90	Replace
Rear Wishbone	90	Inspect/replace
Drive Shafts	60	Replace
Calipers	60	Rebuild
Brake Discs	10	Inspect/replace
Shock Absorbers	60	Rebuild
Steering Rack	60	Inspect/rebuild or replace
Brake Master Cylinder	60	Inspect/replace
Wing Support Stays	60	Inspect/replace
Fuel Tank		remove & inspect annually

If you own and drive the car, but do not prepare or run it yourself, it is your responsibility to be sure that the engineer who does has a copy of this manual, and has read it.