RADICAL SPORTSCARS

MECHANIC'S HANDBOOK – ALL MODELS

VERSION 4.3 – OCTOBER 2015

Table of Contents 2

Foreword 6

Mechanic's Job Responsibilities over race/test 7

Pre-Event Planning 7

Mechanic's Responsibilities At Circuit 7

Pre Session Checks 8

Take To Pit Lane 9

When Car Comes Into Pits: 9

Radical Fastest Laps 10

Service Schedule 11

Component Lifing Information 12

Set-up Procedure – New Car 13

Corner weight setup 13

Very Wet Setup Guide 14

Drop Height Sheet – SR1 15

Drop Height Sheet – SR3 & SR8 16

Drop Height Sheet- RXC (All Models) 17

Drop Height images - RXC (ALL MODELS) 18

Roll Bar Size Chart 20

SR3 and SR8 Roll Bar Sizes: 20

RXC Roll Bar Sizes: 20

Handling & Setup Guide 21

Some Examples of Driver Feedback 21

Radical 3-Way Dampers 23

Spring Rates 24

Brake Bias Settings 25

Brake Disc Bedding 26

Pre-session warm up. 26
Tyre Safety Advice & Other Information 27
Tyre Saftey Advice – Deflection 27
Advice on the handling of race tyres in cold temperatures 28
Tyre Saftey Advice – 29
Tyre Wear Patterns 30
Golden Rules 30
Cold Tear 31
Very well used front tyre. 32
Recommended Gear Ratio Chart 33
SR3 Gear Ratio Chart 34
SR3 Gear Drive Unit – exploded diagram 35
SR8 Gear Chart – Hypoid Gearbox 36
RPE 6 speed Transaxle Gear Ratios for RADICAL SR8 hypoid and Non-Hypoid 37
Non-hypoid gear ratio list: 37
Hypoid gear ratio list: 37
RPE 6 speed Transaxle Gear Ratios For RADICAL SR8 (HYPOID) 38
SR8 Gear Ratio Chart – Hypoid – Short 39
SR8 Gear Ratio Chart – Hypoid – Medium 39
SR8 Gear Ratio Chart – Hypoid – Long 40
SR8 Gear Ratio Chart – Hypoid – Extra Long 40
SR8 (hypoid) Gearbox – exploded drawing 41
SR8 Gearbox Parts List 42
RXC Gearbox Ratio Chart and Part numbers 43
RXC 7-speed – Exploded Diagram 44
Radical gearbox running in information 48
Life Racing / Engine Data Software 49
PTMon – Screen Layout 49

Life Data Software 50
Life ECU Data Explained. 51
Life View Software 53
Life ECU Parameters Explained (All Models) 54
Aim Data Software 55
Race Studio 2 55
Race Studio Analysis 55
Downloading Data from the AIM Data logger (MXL Pista Dash) 55
Viewing previously downloaded AIM data in Race Studio Analysis 57
Torque Settings 58
SR3 engine & gear drive unit 58
SR8 engine & gearbox 59
Suspension Components 60
Brake discs and calipers 61
RXC Torque Settings 62
Lubricant Guide 63
Sensor and actuator Calibration Guide – All models 64
Gear Actuator Setup - SR8 and RXC 64
Gear Position Sensor Setup 64
Wheel Speed sensor installation and setup – all models 65
Jenvey Drive-By-Wire Throttle Bodies Tps Setup 66
Power Steering setup and calibration – Rxc and RXC Spyder 68
Trouble-shooting Guide 69
Trouble-shooting Guide – Starting - SR3 & SR8 69
Trouble-Shooting Guide – Engine Mis-Fire 70
Troubleshooting Unequal Bank To Bank Running On V8 Engines 71
Paddle shift Trouble Shooting Guide 72
Paddle shift Trouble Shooting Guide - Upshift 73

Paddle shift Trouble Shooting Guide - Downshift 74

Contact Details for Key Staff at Radicalsportscars 75

Appendices 76

Pre Race / Test CheckList 76

Overnight Checklist 78

Workshop Check Sheet 79

SR1 Setup sheet 83

SR3 RS Setup Sheet 84

SR3 RSX setup sheet 85

SR8 Setup sheet 86

RXC / RXC Spyder Setup Sheet 87

RXC Fuse board layout 88

Document revision history 90

FOREWORD

This Race Mechanics Handbook has been created to guide all engineers - irrespective of ability or experience – through the procedures and services that are required to maintain the entire range of Radical cars to a standard we believe customers demand and deserve.

These pages contain expertise from our fifteen years of production, testing and racing the cars, as well as information direct from partners and suppliers. If this book is followed diligently and sympathetically it will improve our customer's appreciation and satisfaction of our world leading product range.

This book is therefore also designed to be used by car owners as well as technicians.

Our aim is to ensure every customer is happy and they all enjoy our products, this book will help see that goal realised.

Phil Abbott
Founder and Managing Director

MECHANIC'S JOB RESPONSIBILITIES OVER RACE/TEST

PRE-EVENT PLANNING

- Departure and travel plans should be finalised, with all others involved knowing purpose of test/race.
- Mechanic who is charge of running the car should find out:-
  - Noise limits, and take the necessary silencers to pass noise tests.
  - Session times and where and when signing on is to direct the driver when necessary.
- All spares should be checked and packed, with the person who is in charge of the car taking responsibility for test parts and any extras that may be required.
- Mechanic running the car should have all of the cars history and specific car parts, such as fuel dump tanks, dive planes and have tyres sorted for test/race.
- As and when possible have structured test plans for track time available.

MECHANIC'S RESPONSIBILITIES AT CIRCUIT

- Follow timetable as closely as possible.
- Make sure car is noise tested as soon as possible.
- Ensure car is warmed up and ready to go 10 minutes prior to session (Oil at 50°C min and water at 70°C min).
- Ensure driver(s) is where they should be - signed on, briefings attended and ready in good time for the session.
- Ensure driver is fully aware of any new parts on the car, whether it is brake pads, discs, tyres or development parts.
- Ensure driver knows the procedure for running any new parts, whether or not they needed bedding in, and if so how it should be done and for what length of time.
- Ensure driver knows what is expected of them, whether it's testing of new parts, bedding-in new parts or setting the car up.
- Ensure a full log of car history is kept, including fuel used, parts used and replaced, running time of car and development parts, and reasons for changing parts.
- Make sure any failed parts are kept for inspection, with technical staff notified where possible.
- With parts failures and development parts, and any other issues, be sure to follow correct channels and report to correct people as soon as possible – i.e. technical team notified.
- Make sure the car is downloaded, and check all critical values are within parameters, including:-
  - Oil temp between 70°C and 120°C
  - Car is charging at 13V to 14V

- Water temp between 60°C and 95°C
- Fuel pressure around 3 bar etc

Make sure this information is available when necessary.

- Ensure all number 2 mechanics have a structured job list to work to, and involve them as much as possible on decisions to make changes to the car so that they have a better understanding of how the car works.
- Appear professional at all times, such as keeping work areas tidy as possible, directing drivers to where their kit should be stored (i.e. not in working areas)
- Once own car is prepped for next session, and all aspects of car are working, i.e. data logger, radio systems etc., help out others within the team to get cars ready and out on time.
- Try to communicate with others around you so as many people as possible are aware of a situation.
- Any extra jobs, other than standard prep, required when the car returns to the factory should be noted, so that whoever preps the car will be aware of the required work.
- Above all, carry out procedures with the Radical Team in mind, acting as a single team and representing the team in as professional a manner as possible, whether conducting private tests or away assisting overseas clients and/or distributor.

PRE SESSION CHECKS

1. Tyre pressure set on all wheels, including spares (and wets)
2. Levels – Oil, water and brake/clutch fluid
3. Wheels tight
4. Correct setup for conditions
5. Oil temp above 50°C
6. Gearbox warmed up (SR8 only)
7. Fire extinguisher active/pin removed
8. Correct amount of tape on the radiators
9. Correct fuel level
10. Check for fluid leaks – Fix or Report

Pre-Race/Test-, Overnight- and Workshop Checklist can be found in the Appendix

TAKE TO PIT LANE

1. Spare wheels and wets if required
2. Radio if required
3. Tyre pressure gauge
4. Tyre temperature gauge
5. Lap time sheets and stop watch
6. Pit board and numbers
7. Jump battery (SR8 only)
8. Tools bag – Allen keys, spanners, tank-tape etc
9. Air-line(s), lance, air gun
10. Spare dive planes and roll bars
11. Spare wheel nuts and clips
12. Water for the driver

WHEN CAR COMES INTO PITS:

1. Is driver ok? (Any setup changes etc…)
2. Tyre Pressures
3. Tyre Temperatures
4. Oil & Coolant Temperatures
5. **Check for fluid leaks – Fix or Report**
6. Blockages in intake grilles/ducts
7. Collect data

RADICAL FASTEST LAPS

Track	SR1	Date	Driver	SR3	Date	Driver	SR8	Date	Driver
Anglesey				1.26.088	10.9.11	James Abbott			
Ascari	1.28.5	10.3.14	Mark Crader	2.04.503	10.3.14	Bradley Ellis	2.02.302	9.3.14	David Hansson
Barcelona				1.50.846	4.11.12	Rob Wheldon	1.45.682	2.11.14	Bradley Smith
Brands GP				1.24.953	15.9.12	Matt Bell	1.22.752	4.6.11	Alex Brundle
Brands Indy	49.56	1.6.13	Colin Noble	45.192	14.8.10	Alex Kapadia	44.029	14.8.10	Ross Kaiser
Cadwell Park	1.30.83	31.8.13	Colin Noble	1.23.041	11.10.14	Lewis Plato			
Castle Combe				1.04.105	2.8.14	Phil Keen			
Dijon				1.18.889	10.10.09	Nicolas Powilewicz	1.14.318	10.10.09	Stuart Moseley
Donington Park Nat				1.06.532	25.9.10	Rob Wheldon	1.02.974	25.9.10	Rob Huff
Donington Park GP	1.39.85	20.9.14	Dave Morgan	1.29.327	7.10.12	Bradley Ellis	1.25.735	7.10.12	James Littlejohn
Hungaroring				1.49.407	21.8.10	Marco Cencetti	1.45.185	6.7.14	Tristan Viidas
Imola				1.48.703	2.7.11	Stuart Moseley	1.43.620	2.7.11	Per Staaf
Monza				1.56.269	26.4.08	Lionel Stebler	1.47.250	28.9.14	Bradley Smith
Nürburgring				2.00.568	27.6.10	Marco Cencetti	1.57.184	4.5.14	Tristan Viidas
Oulton Park Int	1.45.66	6.7.13	Colin Noble	1.36.143	14.5.11	Stuart Moseley	1.33.328	28.7.12	Stuart Moseley
Oulton Park Island				1.21.876	31.5.10	Stuart Moseley	1.18.350	26.5.07	Stuart Moseley
Paul Ricard				2.09.790	21.7.12	Rob Wheldon	2.05.421	21.7.12	James Littlejohn
Pembrey				54.484	26.6.10	Colin Millar			
Portimao				1.49.550	5.3.13	James Abbott	1.44.494	2.8.09	Rob Wheldon
Red Bull Ring				1.36.743	26.8.12	Rob Wheldon	1.30.128	26.8.12	Stuart Moseley
Rockingham				1.18.274	10.4.10	Rob Wheldon	1.15.947	10.4.10	Ross Kaiser
Silverstone GP				2.03.692	16.4.11	Stuart Moseley	1.59.037	17.8.14	James Littlejohn
Silverstone National				55.222	12.5.12	Bradley Smith			
Snetterton 300	1.58.63	26.10.13	Colin Noble	1.49.381	16.10.11	Stuart Moseley	1.44.730	10.3.12	Bradley Ellis
Spa				2.26.385	8.5.10	Marco Cencetti	2.16.774	8.5.10	Ross Kaiser
Thruxton				1.11.943	28.8.10	Stuart Moseley	1.09.175	28.8.10	Ross Kaiser
Yas Marina				2.14.034	16.10.10	Damien Faulkner	2.09.261	16.10.10	Ben Bailey
Zandvoort				1.40.945	24.7.10	Marco Cencetti	1.37.748	24.7.10	Dean Stoneman

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

SERVICE SCHEDULE

As the performance of our cars increases and the number of hours racing the cars grows, we are able to more accurately predict the lifespan of a car's components. Please see over, the revised 'Radical Lifing Information 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 consider reducing the timescales recommended. On the other hand, more 'gentle' trackday use will obviously extend the recommended time!

The recommended life expectancies in no way represent a parts warranty, due to the unpredictable and uncontrolled use of these racing car components Radical will not be held responsible or accountable for any parts failure. This information is provided solely as a guide to increase the safety of the cars.

	RPE 1500 (Long Stroke)	RPE 1500 (Short Stroke)	SR8 2.7 V8	RXC Spyder 3.0 V8
Engine	40 hours	45 hours	40 hours	40 hours
Drive Unit/Gearbox	45 hours	45 hours	40 hours	40 hours
Fuel Filter	Every Engine Refresh	Every Engine Refresh	Every Engine Refresh	Every Engine Refresh
Service Injectors	Every Engine Refresh	Every Engine Refresh	Every Engine Refresh	Every Engine Refresh
Caliper Seals	6 months	6 months	4 months	4 months
Spark Plugs	Every Engine Refresh	Every Engine Refresh	Every Engine Refresh	Every Engine Refresh
Air Compressor	80 hours	80 hours	80 hours	80 hours

COMPONENT LIFING INFORMATION

Model	SR1		SR3 RS		SR3 RSX		SR8		RXC Spyder		RXC 3.7 V6		RXC 3.5 V6T		RXC V8	
	Hours	Mileage (km)	Hours	Mileage (km)	Hours	Mileage (km)	Hours	Mileage (km)	Hours	Mileage (km)	Hours	Mileage (km)	Hours	Mileage (km)	Hours	Mileage (km)
Engine (warranty)	60	N/A	40	N/A	45	N/A	40	N/A	40	N/A	N/A	N/A	N/A	N/A	40	N/A
rebuild																
Gearbox/ GDU	100	8000	50	4000	50	4000	50	4000	50	4000	60	5000	50	4000	50	4000
inspect/ rebuild																
Fr Uprights inc. hubs	100	8000	80	8000	80	8000	80	8000	100	10000	100	10000	100	10000	100	10000
replace																
Rr Uprights inc. hubs	100	8000	100	9000	100	9000	90	9000	100	10000	100	10000	100	10000	100	10000
replace																
Standard driveshafts	60	5500	50	4500	50	4500	80	8000	100	8000	100	8000	100	8000	100	8000
replace																
H-D driveshafts	N/A		100	10000	100	10000	N/A		N/A		N/A		N/A		N/A	
replace																
Suspension bushes	40	3500	30	3000	30	3000	20	2000	20	2000	40	4000	30	3000	20	2000
replace																
Suspion rose joints	5-10	500-1000	5-10	500-1000	5-10	500-1000	5-10	500-1000	5-10	500-1000	5-10	500-1000	5-10	500-1000	5-10	500-1000
inspect																
Front wishbones	100	8000	100	10000	100	10000	80	8000	100	10000	100	10000	100	10000	100	10000
replace																
Rear wishbones	100	8000	100	10000	100	10000	80	8000	100	10000	100	10000	100	10000	100	10000
replace																
Brake discs	60	5000	40	3500	40	3500	20	2000	20	2000	20	2000	20	2000	20	2000
replace																
Shock absorbers	40	3000	40	3500	40	3500	40	3500	40	3500	40	3500	40	3500	40	3500
dyno check																
Master cylinders	100	10000	100	10000	100	10000	100	10000	100	10000	100	10000	100	10000	100	10000
replace																
Chain & Sprocket	40	3000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
replace																

SET-UP PROCEDURE – NEW CAR

1. **Check front pushrod lengths are equal & front springs have 3 turns of pre-load**
2. **Check rear spring platform-to-cap distance is equal (approx. 125mm)**
3. **Ballast with 80Kg (10Kg in footwell by the pedals, 70Kg in seat) unless specific driver weight called for on build sheet**
4. **Lock steering to straight ahead using dummy steering wheel**
5. **Set tyre pressure to hot pressure from setup sheet**
6. **Disconnect front & rear anti-roll bars**
7. **Check dampers are set to minimum all round**
8. **Bounce & roll car**
9. **Check drop heights and adjust average of front & rear to be within 1mm of target**
10. **Set cambers (+ or – 0.1° from target)**
11. **Set toes (+ or – 0.5mm from target)**
12. **Roll car off platform, turn on scales and zero**
13. **Roll car back onto platform, repeat bounce & roll**
14. **Check corner weights. Target is within 10Kg across front, and within 2% for diagonals**
15. **Adjust using rear platforms only**
16. **Re-adjust drop heights equally on front pushrods and rear spring platforms to achieve target.** (The drop height will probably not be equal, due to the offset seating position, so target drop height should be an average of the left & right readings.)
17. **Re-connect anti-roll bars making sure there is no pre-load**
18. **Set dampers**
19. **Turn off scales**
20. **Front diffuser height is set at the middle wooden skid first, at the stated height for the car model (or not below 40mm) than at the side skids to ensure the front is level. Then set a camber gauge on the side skirts and make the diffuser top level from front-to-rear and then drill and rivet the rear support bracket.**

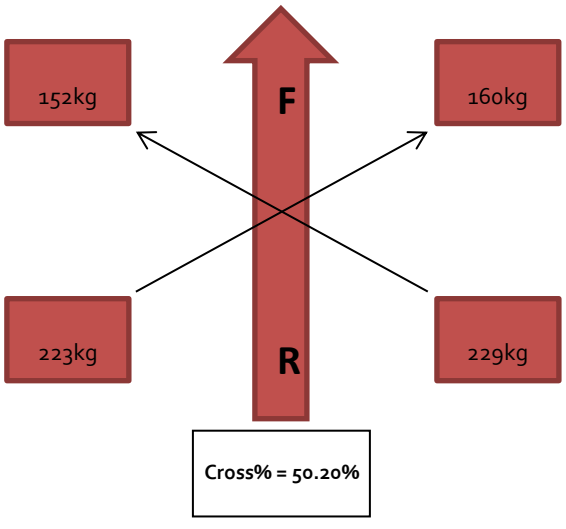
ALL Setup Sheets can be found in the Appendix

CORNER WEIGHT SETUP

One of the most important factors is to ensure that the front corner weights are as equal as possible. The cross weight is not as crucial in comparison. (The offset driving position of the driver will usually mean that the weight cannot be made exactly equal.)

To adjust the front corner weights, raise or lower the diagonal rear.

The maximum difference in front weights should be no more than 10kg (22lb



VERY WET SETUP GUIDE

Camber		
½° less negative		½° less negative
¼° less negative		¼° less negative

Toe	
Do NOT change	Do NOT change
Do NOT change	Do NOT change

Dampers		Springs / pre-load			Dampers	
Bump LS	5 softer	Front anti-roll bar			Bump LS	5 softer
Bump HS	10 softer		Next softest		Bump HS	10 softer
Rebound	5 softer	5Nm softer, same P/L		5Nm softer, same P/L	Rebound	5 softer

Corner Weights / Ride Height	
Do NOT change	Do NOT change

Dampers		Rear anti-roll bar			Dampers	
Bump LS	5 softer	10Nm softer	Next softest	10Nm softer	Bump LS	5 softer
Bump HS	10 softer				Bump HS	10 softer
Rebound	5 softer				Rebound	5 softer

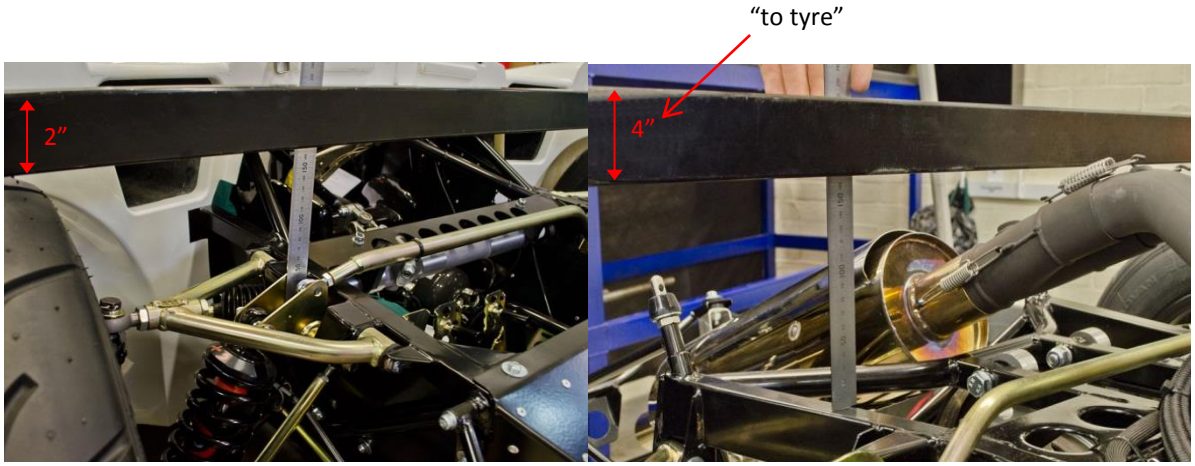
Do NOT change	Do NOT change

Dive Planes	Plus 1	Tyre Pressure (cold)		
		Hot slick minus 2psi		Hot slick minus 2psi
Rear Wing		Hot slick minus 2psi		Hot slick minus 2psi
Main				
Flap	Up 1 hole			

Brake Balance
3 turns to rear

DROP HEIGHT SHEET – SR1

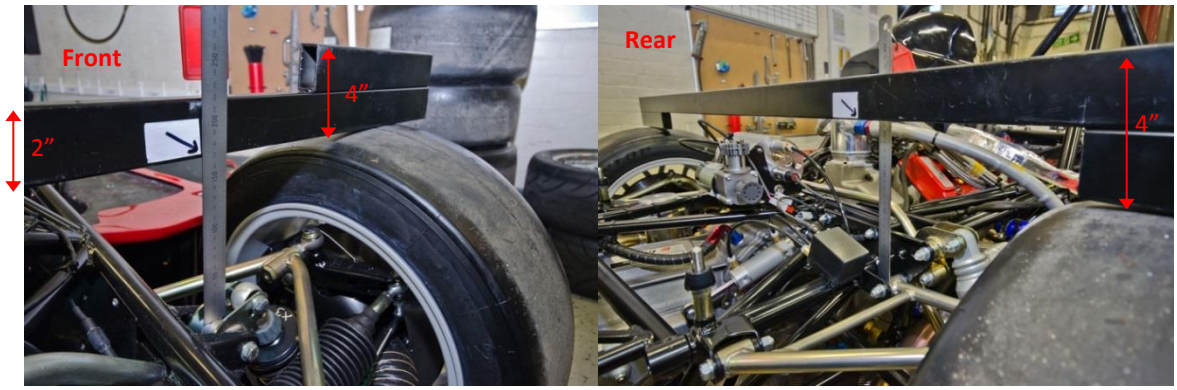
Front Ride Height		Rear Ride Height	
Drop (mm)	Actual (mm)	Drop (mm)	Actual (mm)
180	56	173	56
179	57	172	57
178	58	171	58
177	59	170	59
176	60	169	60
175	61	168	61
174	62	167	62
173	63	166	63
172	64	165	64
171	65	164	65
170	66	163	66
169	67	162	67
168	68	161	68
167	69	160	69
166	70	159	70
165	71	158	71
164	72	157	72
163	73	156	73
162	74	155	74
161	75	154	75
160	76	153	76



DROP HEIGHT SHEET – SR3 & SR8

FRONT				REAR	
Measuring to Rocker Pivot				To front bush of RTWB	
Front Drop Height	Ride Height	Calculated Ride height under lowest point on chassis		Rear Drop Height	Ride Height
153mm	90mm	70mm		210mm	80mm
154mm	89mm	69mm		211mm	79mm
155mm	88mm	68mm		212mm	78mm
156mm	87mm	67mm		213mm	77mm
157mm	86mm	66mm		214mm	76mm
158mm	85mm	65mm		215mm	75mm
159mm	84mm	64mm		216mm	74mm
160mm	83mm	63mm		217mm	73mm
161mm	82mm	62mm		218mm	72mm
162mm	81mm	61mm		219mm	71mm
163mm	80mm	60mm		220mm	70mm
164mm	79mm	59mm		221mm	69mm
165mm	78mm	58mm		222mm	68mm
166mm	77mm	57mm		223mm	67mm
167mm	76mm	56mm		224mm	66mm
168mm	75mm	55mm		225mm	65mm
169mm	74mm	54mm		226mm	64mm
170mm	73mm	53mm		227mm	63mm
171mm	72mm	52mm		228mm	62mm
172mm	71mm	51mm		229mm	61mm
173mm	70mm	50mm		230mm	60mm
174mm	69mm	49mm		231mm	59mm
175mm	68mm	48mm		232mm	58mm
176mm	67mm	47mm		233mm	57mm
177mm	66mm	46mm		234mm	56mm
178mm	65mm	45mm		235mm	55mm
179mm	64mm	44mm		236mm	54mm
180mm	63mm	43mm		237mm	53mm
181mm	62mm	42mm		238mm	52mm
182mm	61mm	41mm		239mm	51mm
183mm	60mm	40mm		240mm	50mm
184mm	59mm	39mm		241mm	49mm
185mm	58mm	38mm		242mm	48mm
186mm	57mm	37mm		243mm	47mm

Chassis rake will be the difference between "Calculated Ride height" & Rear "Ride Height"
Measuring bar is inverted between front & rear measurements.



SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

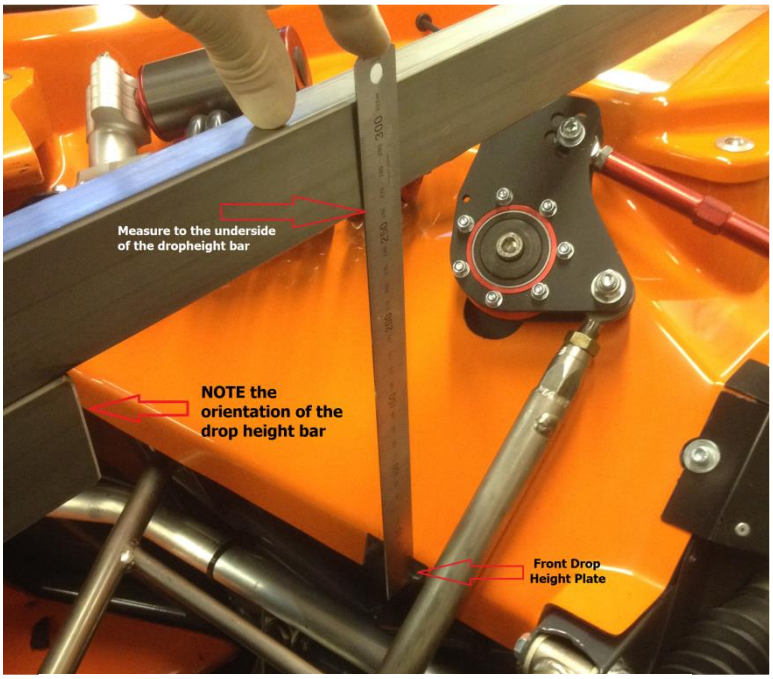
DROP HEIGHT SHEET- RXC (ALL MODELS)

RXC drop heights are measured using the same drop height bar as all of the other models. This is constructed from 2 inch by 1 inch box section with an additional 2inch by 1 inch box section welded below to give clearance.

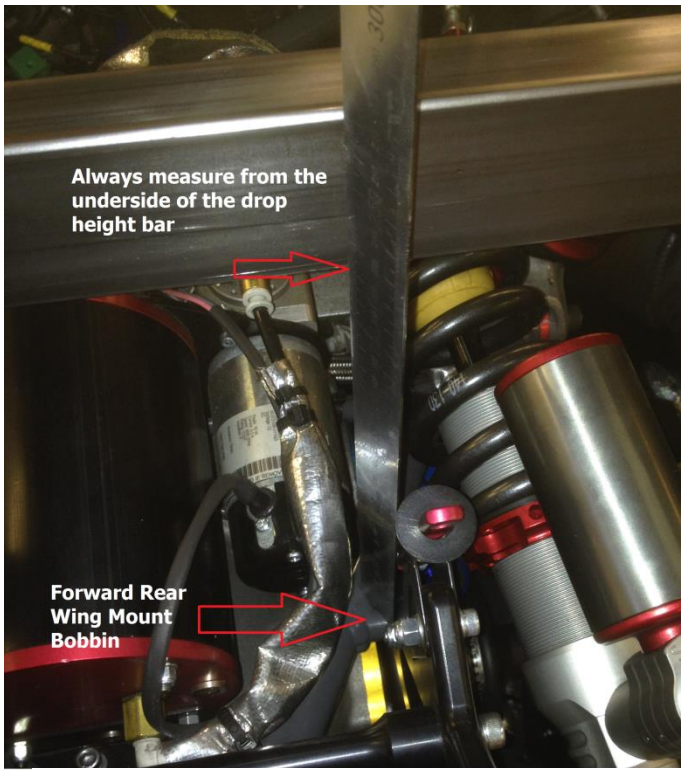
Note: On the RXC the drop height bar is used the same on the front as the rear. This is different to the other models (SR3, SR8, SR1). Please see the following pictures to show where the drop heights are measured to.

Ride Height Actual	Drop Height Slicks	Drop Height Setup Wheels
70	276	350
71	275	349
72	274	348
73	273	347
74	272	346
75	271	345
76	270	344
77	269	343
78	268	342
79	267	341
80	266	340
81	265	339
82	264	338
83	263	337
84	262	336
85	261	335
86	260	334
87	259	333
88	258	332
89	257	331
90	256	330
91	255	329
92	254	328
93	253	327
94	252	326
95	251	325
96	250	324
97	249	323
98	248	322
99	247	321
100	246	320
101	245	319
102	244	318
103	243	317
104	242	316
105	241	315
106	240	314
107	239	313
108	238	312
109	237	311
110	236	310

DROP HEIGHT IMAGES - RXC (ALL MODELS)



Front Drop Height plate



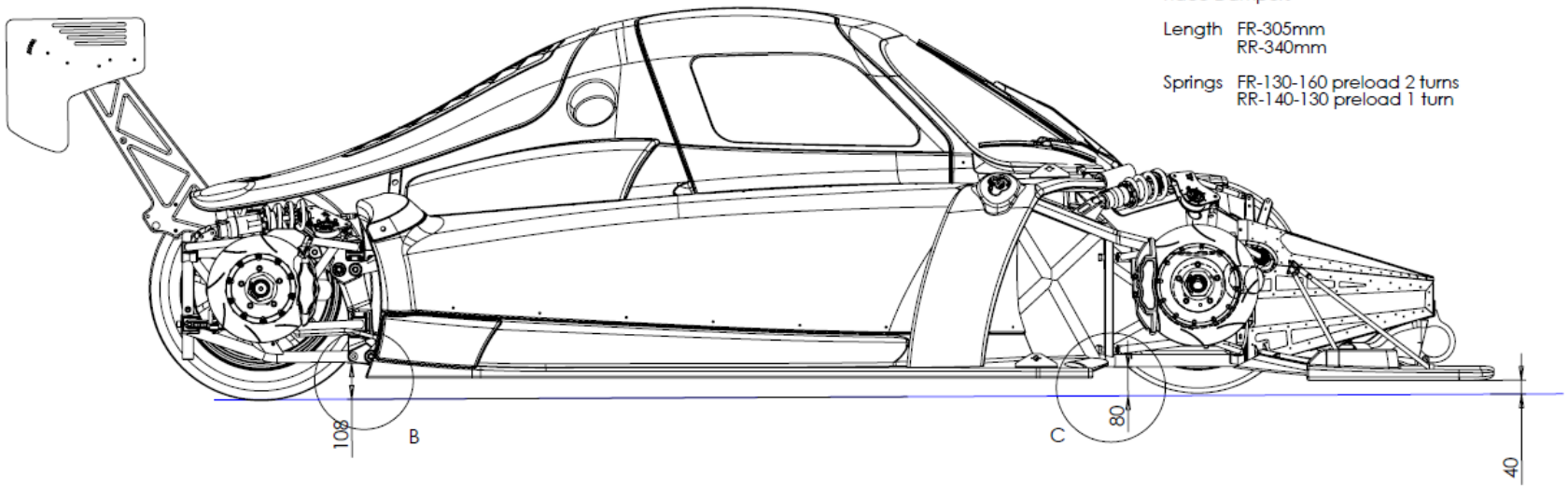
Rear Drop Height Forward Wing Bobbin

Set-Up Notes

Race Dampers

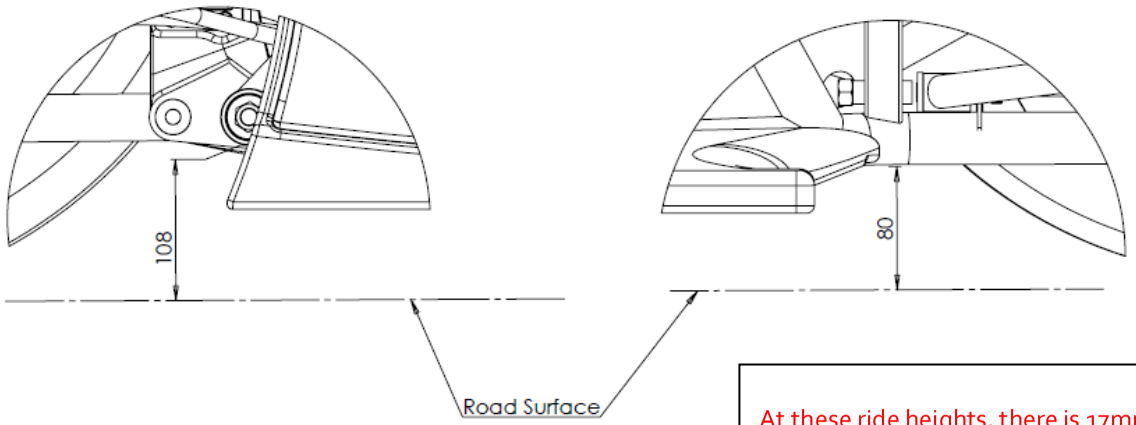
Length FR-305mm
RR-340mm

Springs FR-130-160 preload 2 turns
RR-140-130 preload 1 turn



REAR CHASSIS MEASURMENT-
taken from the underside of the welded chassis boss

FRONT CHASSIS MEASURMENT-
taken from the underside of chassis skin



At these ride heights, there is 17mm of chassis rake

ROLL BAR SIZE CHART

SR3 AND SR8 ROLL BAR SIZES:

FRONT

SOFT	5/8"	15.8mm	
MEDIUM	¾"	19.0mm	
HARD	7/8"	22.2mm	GOLD
EXTRA HARD	7/8"	22.2mm	BLACK

REAR

SOFT	½"	12.7mm	
MEDIUM	5/8"	15.8mm	
HARD	¾"	19.0mm	
EXTRA HARD	7/8"	22.1mm	GOLD
SUPER HARD	7/8"	22.1mm	BLACK

RXC ROLL BAR SIZES:

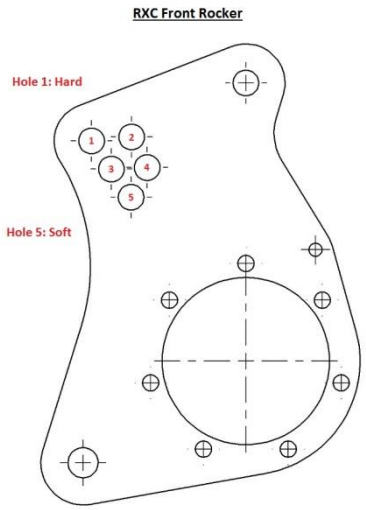
FRONT

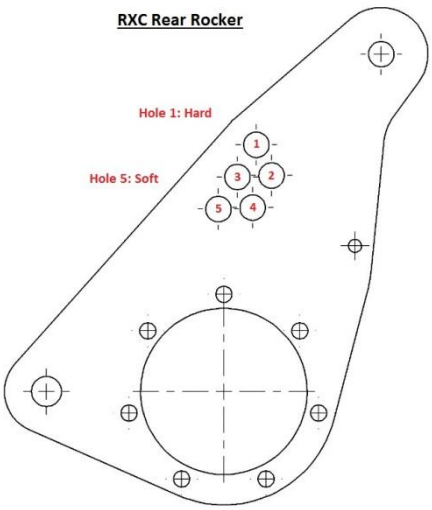
SOFT	7/8"	22.2mm
MEDIUM	1"	25.4mm
HARD	1 1/8"	28.6mm

REAR

SOFT	5/8"	15.9mm
MEDIUM	3/4"	19.0mm
HARD	7/8"	22.2mm

Adjustments can be made for each thickness of rollbar using the 5 holes on the rockers. This range of adjustment is explained in the pictures below. The rollbar should always be re-connected with the driver weight in the car and there should be no pre-load on the bolts.





HANDLING & SETUP GUIDE

For ALL handling issues the first and most important thing to check is TYRES:-

- **Pressure**
- **Condition**
- **Temperature**

Pressure for Dunlop tyres, should be in the range of 28psi to 30psi hot, the working temperature is minimum 70°c and ideally around 90°c. Temperature spreads, across the tyre tread **must not exceed** 15°c on the front tyres and 10°c on the rear tyres. Over 110°c and the tyre is beginning to overheat. The condition can be more complicated; if you know that the tyres have a lot of miles or have had many heat cycles then, before anything else, try another set.

Also look at the tyres for:-

- **Graining or heavy wear**
- **Unusual colouring**
- **Is there a lot of 'pickup'?**

All these are a good indicator of what is causing problems.

The next priority is to talk with the driver and make a circuit map, if possible, with information on each part of every corner. You can then decide if the problem is slow, medium or fast corners or everywhere, and if it is entry, mid corner, or exit. There are always various options to rectify any handling issue and all will have a downside, but we have to try and chose the best for each corner bearing in mind which the most important corners are, and which problems are caused by the nature of the circuit.

It is important to understand the difference between understeer and oversteer.

- **Understeer** is when the front tyres have insufficient grip to make the car turn so more steering lock is applied.

- **Oversteer** is the rear tyres not having enough grip.

If you have entry and mid-corner understeer, you will probably get exit oversteer, as you will have applied too much lock and then when the 'G-force' and speed have dropped and you start to apply power it will make the car snap to oversteer, and this is what the driver remembers so if you try to cure the oversteer it will probably get worse.

This is why it is very important to ask the driver a lot of questions before deciding what to do.

SOME EXAMPLES OF DRIVER FEEDBACK

Driver Feedback	Cause
"Slow speed entry understeer"	The most common cause is too soft front Nik Link or springs, or front ride height too high, also it could be too little front rebound.
"Slow speed entry oversteer"	If braking from high speed to a slow corner the problem is probably caused by the car pitching too much, so more rear toe in or lowering the rear ride height will help.
	Increasing the rear rebound, if it is entering from medium or low-speed then softer rear 'Nik-link' *or* maybe springs.
	Reducing rear camber will increase rear grip at slow-speed, so check the rear tyre temps.

- **With all medium to high speed entry and mid-corner problems,** you should first try to solve with an increase or decrease in front or rear downforce. This can be achieved with dive planes and rear wing flap or with ride-height adjustment. In general, a lower ride height gives more downforce, and will also increase mechanical grip.

- **If downforce or ride height is not the answer,** then try an increase in camber to increase high-speed grip, but this in-turn will decrease slow-speed grip.

  For example: **If you have high-speed mid-corner oversteer,** then increasing the camber should help, but it will decrease traction out of slow corners.

- **Corner exit problems at all speeds** are generally a result of what has happened in the mid-corner. However, out of slow-speed corners, traction can be improved by reducing rear camber (as above) or softening the rear 'Nik-link' or springs. Reducing rear compression damping, can help as well.

  If you make the opposite change to the front of the car it will also have a similar effect.

In fast corners going stiffer with springs and maybe bars will generally increase grip.

- **Increasing 'toe-out' at front and 'toe-in' at the rear** will increase stability and tyre temps. Increasing spring rates and tyre pressure will also increase tyre temperatures and tyre wear.

- **Damping** has many functions, but primarily it is used to keep the tyre in contact with the track by controlling the spring and chassis movement frequencies, so in general you want to keep the springs and dampers as soft as possible, but stiff enough to control the roll and pitch of the car. Then, the balance is controlled by the roll and spring rate differences front to rear and aero levels.

- The adjustments on the dampers are called low or high speed compression and rebound. Low or high speed refers to damper piston speed, <u>not</u> car speed.

  For example; on entry to a high-speed corner, the lateral load transfer is relatively slow as you gradually apply more lock, so the damper movement is slow. Whereas if you go over a kerb at any speed the damper movement is fast, braking and turn-in to a slow corner is much more aggressive than in a fast corner, therefore the damper movement is faster, but usually not as fast as over kerbs.

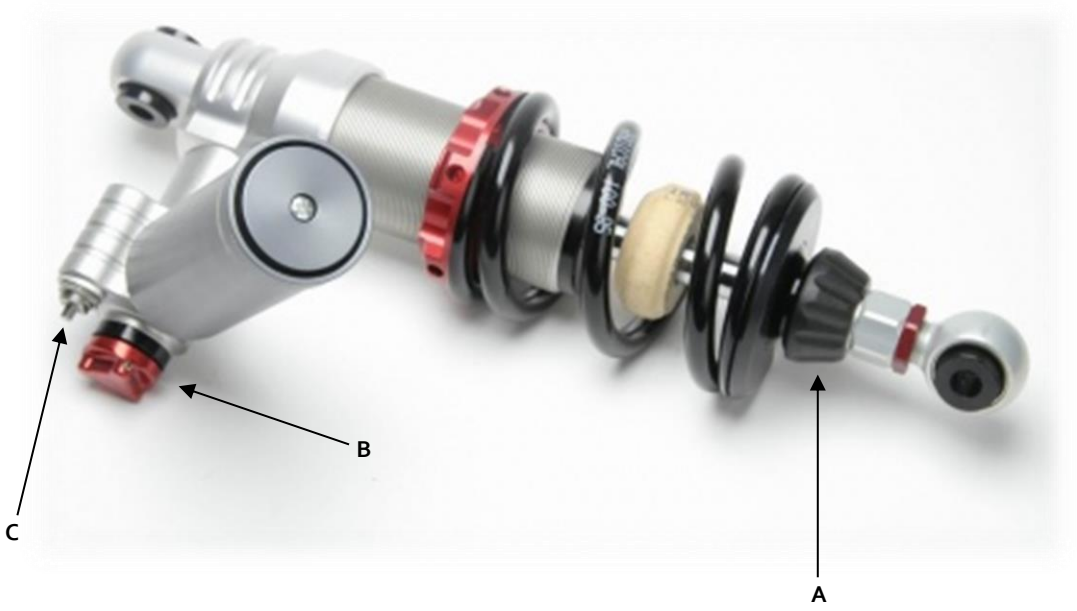
  The damping force increases with the speed of the piston:-

- If you make the high-speed adjustment too stiff, the damper will not move fast enough and the car will bounce rather than ride the kerb.

- If you have the low-speed adjustment too soft, the car will not respond to driver inputs quick enough in the corners.

- **Increasing rebound is a good way to increase grip,** but it will also increase ride 'harshness', which can make the car skip across the track. There are no simple answers, but damping adjustments are quick to do in the pit lane and will give you more information to help resolve the issues later.

RADICAL 3-WAY DAMPERS



Basic setting:

Front:	A. Rebound
	B. High speed bump compression
	C. Low speed bump compression

A – Rebound:

The rebound controls the speed of the damper's extension. The more rebound resistance you add, the slower the damper will return out. This can be used on the front to fix mid-corner understeer, and on the rear to aid traction

B – High speed bump compression:

High speed bump compression (refers to the speed of the piston rod into the damper) controls the high frequency compressions of the damper. In simple terms it controls how the car reacts to small bumps and curbs. We recommend using no more than +15 clicks from soft.

C – Low speed bump compression:

Low speed bump compression controls how slow or fast the damper reacts under compression. Increasing the low speed bump will have a similar (though smaller) effect to increasing the spring rate.

SPRING RATES

SR3	Ride frequencies																			
Hz	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**4**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**	**4.9**	**5**	**5.1**	**5.2**	**5.3**	**5.4**	**5.5**
Spring Rate Front	80	47	50	53	56	58	61	64	68	71	74	77	81	84	88	91	95	99	103	107	111
N/mm																					
Spring Rate Rear	124	68	72	76	80	84	89	93	97	102	107	112	116	121	127	132	137	143	148	154	159
SR8	**Ride frequencies**																				
Hz	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**4**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**	**4.9**	**5**	**5.1**	**5.2**	**5.3**	**5.4**	**5.5**
Spring Rate Front	49	52	55	58	61	64	67	71	74	78	81	85	89	92	96	100	104	109	113	117	121
N/mm																					
Spring Rate Rear	85	90	95	100	105	111	117	122	128	134	140	147	153	160	167	173	180	188	195	202	210
PR6	**Ride frequencies**																				
Hz	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**4**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**	**4.9**	**5**	**5.1**	**5.2**	**5.3**	**5.4**	**5.5**
Spring Rate Front	42	45	47	50	52	55	58	61	64	67	70	73	76	79	83	86	90	93	97	100	104
N/mm																					
Spring Rate Rear	50	53	56	59	62	66	69	72	76	79	83	87	90	94	98	102	107	111	115	119	124
SR5	**Ride frequencies**																				
Hz	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**4**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**	**4.9**	**5**	**5.1**	**5.2**	**5.3**	**5.4**	**5.5**
Spring Rate Front	51	54	57	60	63	66	69	73	76	80	84	87	91	95	99	103	107	112	116	120	125
N/mm																					
Spring Rate Rear	72	76	80	84	89	93	98	103	108	113	118	124	129	135	140	146	152	158	164	170	177

Ideally front ride frequency should be 10% greater than the rear, and the range is 3.5Hz to 5.5Hz for Radicals.

For example; a bumpy track with no fast corners would not require much downforce and would need soft springs so for an SR3 maybe 4Hz front and 3.6Hz rear.

For a normal track such as Silverstone GP quite high downforce and not too bumpy, you would look at 5Hz front and 4.5Hz rear or stiffer.

BRAKE BIAS SETTINGS

This Brake Bias guide is universal to all Radical models fitted with a Brake Bias Adjuster.

FRONT BRAKE PRESSURE	PERCENTAGE BRAKE BIAS								
	51	52	53	54	55	56	57	58	59
	REAR BRAKE PRESSURE								
20	19.2	18.5	17.7	17.0	16.4	15.7	15.1	14.5	13.9
25	24.0	23.1	22.2	21.3	20.5	19.6	18.9	18.1	17.4
30	28.8	27.7	26.6	25.6	24.5	23.6	22.6	21.7	20.8
35	33.6	32.3	31.0	29.8	28.6	27.5	26.4	25.3	24.3
40	38.4	36.9	35.5	34.1	32.7	31.4	30.2	29.0	27.8
45	43.2	41.5	39.9	38.3	36.8	35.4	33.9	32.6	31.3
50	48.0	46.2	44.3	42.6	40.9	39.3	37.7	36.2	34.7

WET START POINT DRY START POINT

To adjust brake bias, press the brake pedal and observe the front and rear pressure shown on the dash. Then move the adjuster after releasing the pedal to give the required percentage. Then re-check the setting on the dash.

The yellow highlighted values are a good starting point for DRY, while the blue are for WET.

For example - If the dash is showing 35bar front and 26.5 rear, using the chart above this is about 57%. This means you have too much front brake bias, and you must turn the adjuster to the rear (approx. 1 full turn = 1%), and then recheck the reading on the dash. Final adjustment will be made by the driver on track to suit their style of driving

BRAKE DISC BEDDING

All cast iron brake discs for competition use need to be bedded-in to ensure heat stabilisation and improve resistance to cracking. Cracks or warping can occur during the first few heavy stops if careful bedding is not carried out.

- If ducts are fitted they should be ¾ blanked off.
- Use previously bedded pads.
- For a minimum of 15 Km use brakes gently at first from initially low speeds - progressively raise speed to normal racing speed and gradually increase in pedal pressure.

For the final 2 or 3 applications brakes can be used quite heavily (above 40 bar pressure). The braking potential of the car will start to fade, this is a sign that the bedding procedure is complete. 1 cooling down lap with moderate brake pressure is advisable before stopping the car.

It is possible to pick up a vibration or 'judder' through the brake pedal. This is due to the disk bell and disk becoming aligned for the first time; this is not a process that can be simulated in the build of the car. It is therefore very important that if the driver feels they have brake judder they continue to build up brake pressure and heat in the disk. And not to stop or decrease pedal pressure, to do so has the potential to make the vibration worse.

- After the initial bedding process is complete, allow the brakes to cool. If the car is fitted with a handbrake, do not apply it at this time.

If AP Racing thermal paints are used then only the green paint (430°C) should have fully turned to white and maybe also just the Orange paint (560°C) on the outside edges of the discs during the bedding procedure. If fitted, brake pressures can be used to monitor the bedding in procedure.

PRE-SESSION WARM UP.

With cast iron discs, brake pressures should not exceed 20 bar during the out laps from cold, even with pre-bedded discs. This includes the start of each track day session, practice session, and warm up of a race.

This is to prevent heat shocking the disc and causing cracking.

Heat shocking occurs when the disc is taken from ambient temperature to 600°C very rapidly i.e. heavy braking on the out laps.

TYRE SAFETY ADVICE & OTHER INFORMATION

- Ensure minimum hot pressures are adhered to! (see tables below)
- Calibrate your pressure gauges with ***DUNLOP*** personnel.
- Do not bleed hot pressures on the car without consultation with ***DUNLOP*** personnel.
- Fit valve dust caps throughout.
- Cold pressures should only be set on tyres that have been shaded from direct sunlight. Do not bleed tyres as the ambient temperature rises!
- Temperature spreads across the tyre tread **must not exceed:** ☒ 15°C on the **left front** tyre and ☒ 10°C on the **left rear** tyre. (Temperature measurements to be made at the centre of the tread and 25-30 mm from each edge.)
- Please identify your rims, clean them and remove any centre caps before bringing them for fitting.
- Avoid hitting kerbs with cold tyres as pressures are still building up.

RXC (all models)	Cold (guide only)				HOT (minimum)			
	17 inch		18 inch		17 inch		18 inch	
	PSI	BAR	PSI	BAR	PSI	BAR	PSI	BAR
Dry - front	22	1.5	22	1.5	29	2.0	29	2.0
Dry – rear	21	1.4	21	1.4	29	2.0	29	2.0
Wet – front	25	1.7	25	1.7	29	2.0	29	2.0
Wet – rear	24	1.6	24	1.6	29	2.0	29	2.0

Radical SR3	Cold (guide only)		HOT (minimum)	
	PSI	BAR	PSI	BAR
Dry - front	22	1.5	29	2.0
Dry – rear	21	1.4	29	2.0
Wet – front	25	1.7	29	2.0
Wet – rear	24	1.6	29	2.0

Radical SR8	Cold (guide only)		HOT (minimum)	
	PSI	BAR	PSI	BAR
Dry - front	25	1.7	32	2.2
Dry – rear	23	1.6	32	2.2
Wet – front	26	1.8	32	2.2
Wet – rear	25	1.7	32	2.2

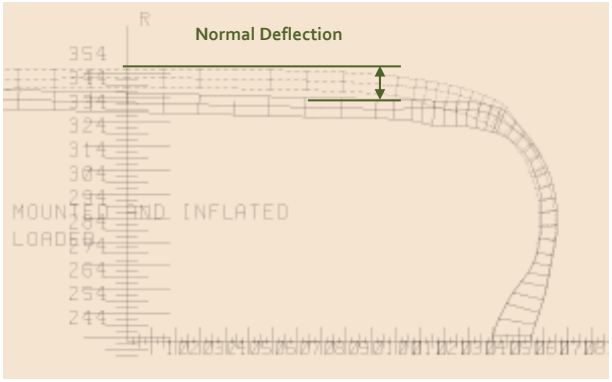
Radical SR1 Dunlop SP Sport	Cold (guide only)		HOT (minimum)	
	PSI	BAR	PSI	BAR
Dry - front	20	1.35	29	2.0
Dry – rear	23	1.6	32	2.3

Please respect this advice to avoid excessive sidewall distortion and the risk of deflation.

TYRE SAFTEY ADVICE – DEFLECTION

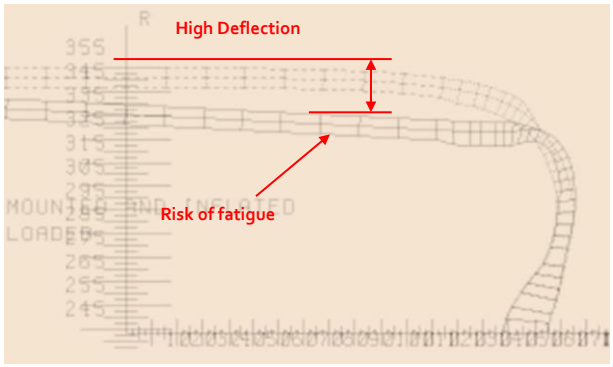
SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER



Correct Camber and Tyre Pressure

= SAFE TYRE SHAPE



Too Much Camber and/or Too Low Pressure

= POOR TYRE SHAPE

ADVICE ON THE HANDLING OF RACE TYRES IN COLD TEMPERATURES

Race tyres (car & motorcycle) can be damaged by rough handling in cold temperatures.

The damage occurs in the form of `hairline' cracks - like very thin splits - often at the edge of the tread and/or the upper sidewall.

This damage occurs when tyres are handled heavily in low temperatures eg. when `thrown' to the floor from a truck or dropped from a storage location.

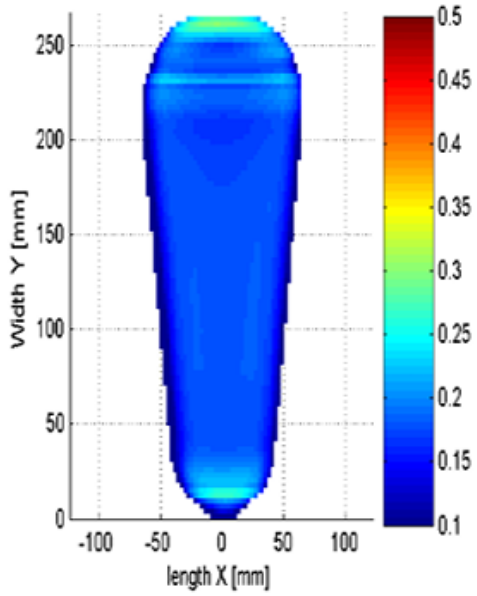
Based on expert advice from the *DUNLOP* Development Centre - Hanau (DDC*H), race tyres should always be stored in accordance with the following recommendations:

Minimum storage temperature +20°C

After prolonged storage in temperatures of less than +10°C, tyres should be handled gently until warmed to +20°C

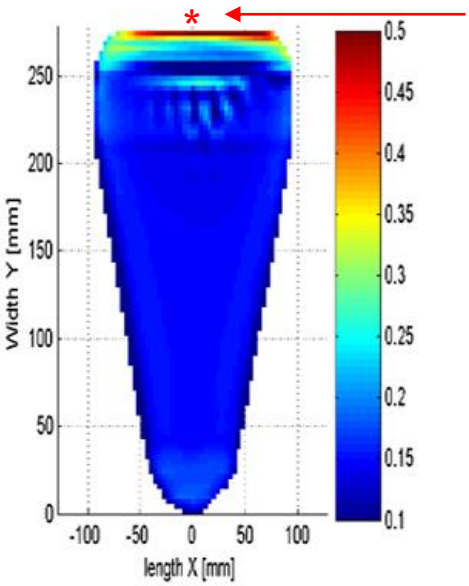
At 5°C and below it is advisable not to move tyres unless absolutely necessary - and then only with extreme care!

TYRE SAFTEY ADVICE –



Correct Camber and Tyre Pressure

= GOOD LOAD DISTRIBUTION



Risk of Fatigue

Too Much Camber and/or Too Low Pressure

= TOO MUCH LOAD ON INSIDE SHOULDER

TYRE WEAR PATTERNS

Conversations and judgements about grip and handling should always be preceded with thorough examination of tyre working surface.

Lots of information and indicators are contained within the whole picture of the tyre and should never be ignored. Not only grip but also longevity can be estimated, which may be more important. It is the only connection between the tyre and the road! There must be information for your "Engineer's Library" in there. Use computer data and visible indicators to get the best all round view of car and tyre behaviour.

Measure tyre temperatures and pressures as often as possible straight after a fast lap, easily done by getting a driver to do a full pace "in" lap, in order to get the best readings. However, be sure not to read the temperature of the pickup on the tyre.

GOLDEN RULES

1. Watch and ask an expert how to take temperatures properly (Dunlop personnel) and practice as often as possible

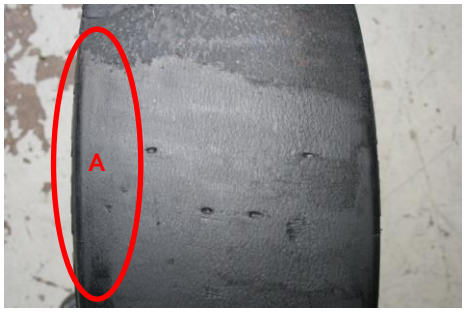
2. When examining a tyre, always check both sides, as the unloaded side can drag the inner wheel into excessive negative camber and over heat the inner edge.

3. Do the loaded side first inner edge to outer edge.

The following is only a guide to make you think more about the subject.

Pretty good rear tyre.
If rear grip is good then it's ok. If rear grip is low, more camber can be added before the tyre is damaged.

Pretty poor front tyre.
Not enough negative camber (A). This car was understeering, looking at the wear depth indicators. The amount of graining is just about okay for a hard worked tyre.

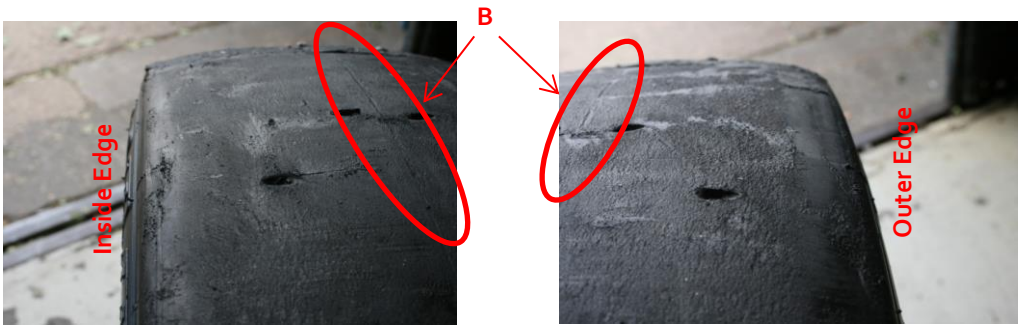


COLD TEAR

This tyre has only done a qualifying session. It shows signs of something known as "*cold tear*" (B), which occurs around the seam of the tread in the centre of the tyre.

Cold Tear is caused by the rubber been torn away rather than grained or rolled. This happens when a driver pushes too hard, too soon, and with no heat in the tyre. If the driver were to wait one more lap, the tyre would be in much better condition. The driver may have had a good result in qualifying from this, but the tyre will struggle during race distance.

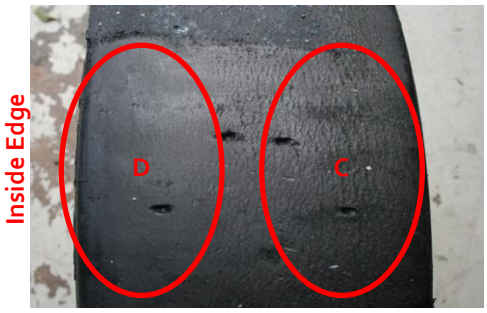
This is dependent on track type, track temperature, air temperature etc.

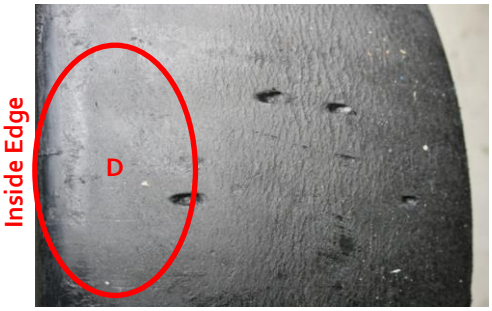


Rear Tyre showing evidence of cold tear.
Looking at wear holes there has been slight over inflation with not enough camber.

VERY WELL USED FRONT TYRE.

Graining is on the outside only (C) with a nearly new tyre on the inside edge indicating nowhere near enough camber (D), resulting in lots of understeer.





Tyre worn so badly that the tread surface has tapered on the inside edge (E) due to excess camber. Has very little pick up on so cleaning never looks good.

RECOMMENDED GEAR RATIO CHART

Circuit	SR8 RX 2.7 Quaife (10,500rpm)	SR8 RX 2.7 Quaife (9,500rpm)	SR3 1500cc Gear Drive	Aero	Note / Warning
Almeria	Short	Medium	3.071:1	H	
Anglesey	Short		3.235:1	H	
Ascari	Medium	Long	3.071:1	M	Hard on tyres
Barcelona	Medium	Long 6th	3.071:1	M	Abrasive, hard on tyres. If warm, reduce camber
Brands Hatch Indy	Short	Medium	3.235:1	H	
Brands Hatch GP	Short	Medium	3.235:1	M	
Cadwell Park	Short		3.40:1	H	Lots of droop, no rebound
Castle Combe	Medium		3.071:1	M	Very bumpy, soften damping
Croft	Short		3.235:1	M	
Dijon Prenois	Long		2.917:1		
Donington GP	Short (but with long 5th as 6th)	Medium	3.235:1	M	Brakes!
Donington National	Short (but with long 5th as 6th)	Medium	3.235:1	M	Brakes!
Estoril	Long	Extra Long	2.917:1	L	Quite bumpy
Hungaroring	Medium	Long	3.235:1	M	
Imola	Long	Extra Long	3.071:1	L	Raise ride height for last chicane
Laguna Seca	Medium	Long	3.071:1		
Mallory Park	Short		3.235:1	H	
Monza	Long	Extra Long	2.917:1	L	Respect Max Rear camber Regulation
Nürburgring GP	Short	Medium	3.235:1	M	
Oulton Park Int'l.	Short		3.235:1	M	Beware bumps at pit exit
Oulton Park Island	Short		3.235:1	M	Beware bumps at pit exit
Paul Ricard	Medium	Long	3.071:1	M	
Pembrey	Short		3.235:1	M	
Portimao	Medium	Extra Long	3.071:1	L	Very bumpy, soften damping
'Red Bull' Ring	Medium	Long	3.071:1	M	Brakes
Rockingham	Medium		3.071:1	M	
Silverstone Arena	Medium	Long	3.071:1	L	
Silverstone Int'l.	Medium	Long	3.071:1	L	
Silverstone National	Short		3.235:1	L	
Snetterton 200	Medium	Long	3.071:1	L	
Snetterton 300	Medium	Long	3.071:1	L	
Spa-Francorchamps	Medium	Long	3.071:1	M	Respect Max Rear camber Regulation
Thruxton	Long	Extra Long	2.917:1	L	Respect Max Rear camber Regulation
Valencia	Medium	Long	3.235:1	M	Abrasive
Zandvoort	Medium	Long	3.235:1	M	Very low grip circuit

SR3 GEAR RATIO CHART

				Ratio	3.594:1	3.409:1	3.235:1	Standard factory fitted ratio (UK cars) 3.071:1	2.917:1	2.770:1
				No. Teeth/ Part No.	32 A-3R 1-20	33 A-3R 1-22	34 A-3R 1-24	35 A-3R 1-26	36 A-3R 1-28	37 A-3R 1-36
				No. Teeth/ Part No.	46 A-3R 1-21	45 A-3R 1-23	44 A-3R 1-25	43 A-3R 1-27	42 A-3R 1-29	41 A-3R 1-37
Gear	**No. Teeth (input)**	**No. Teeth (output)**	**Ratio**	**Rev drop at 10,500 rpm**	**Speed in MPH drop**	**Speed in MPH drop**	**Speed in MPH drop**	**Speed in MPH drop**	**Speed in MPH drop**	**Speed in MPH drop**
1st	13	34	2.615:1	2721.50 2228.35 1655.17 1219.70 858.26	49.61	52.30	55.10	58.05	61.13	64.36
2nd	16	31	1.938:1		66.96	70.59	74.38	78.36	82.51	86.88
3rd	19	29	1.526:1		85.00	89.61	94.42	99.46	104.74	110.29
4th	21	27	1.286:1		100.91	106.38	112.09	118.08	124.34	130.92
5th	22	25	1.136:1		114.17	120.36	126.82	133.60	140.69	148.13
6th	23	24	1.043:1		124.34	131.08	138.11	145.49	153.21	161.32

Max Revs **10,500RPM**

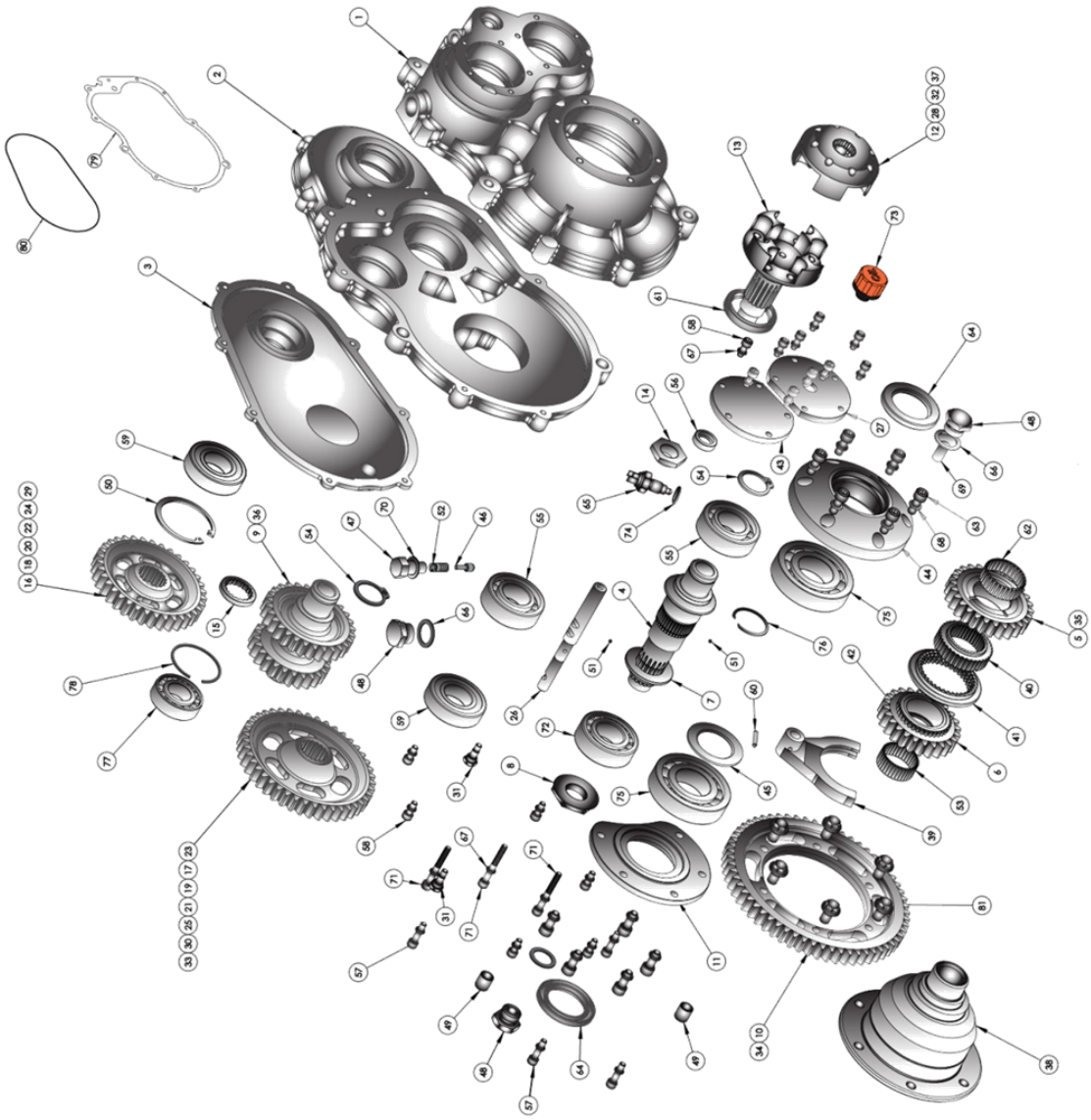
Primary reduction ratio **1.596:1 (83/52)**

Rolling tyre circumference **1.901m (0.605m dia)**

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

SR3 GEAR DRIVE UNIT – EXPLODED DIAGRAM



No.	Part Number	Serial No.	Description	Qty.
1	TQ0111	A3R103	Rear Case	1
2	TQ0112	A3R105	Front Case	1
3	TQ0050	A3R107	Gear Ratio Cover Plate	1
4	TQ0040	A3R108	Main Shaft	1
5	TQ0115	A3R109	Reverse Gear - Main Shaft	1
6	TQ0014	A3R110	Forward Gear - Main Shaft	1
7	TQ0116	A3R111	Thrust Washer - Main Shaft	1
8	TQ0037	A3R112	Locknut - Main Shaft (Left-hand Thread)	1
9	TQ0117	A3R113	Idler Shaft (Incorporating 24T & 28T GEARS)	1
10	TQ0002	A3R114	Crownwheel R2.500:1	1
11	TQ0118	A3R115	Differential Bearing Retainer	1
12	TQ0035	A3R116	Coupling (K7 Engine)	1
13	TQ0036	A3R117	Coupling/Input Shaft	1
14	TQ0038	A3R118	Locknut - Input Shaft (Right-hand Thread)	1
15	TQ0039	A3R119	Gear - Input Shaft	1
16	TQ0049	A3R120	Gear Ratio - Main Shaft, R3.594:1	1
17	TQ0049	A3R121	Gear Ratio - Main Shaft, R3.594:1	1
18	TQ0048	A3R122	Gear Ratio - Input Shaft, R3.409:1	1
19	TQ0048	A3R123	Gear Ratio - Main Shaft, R3.409:1	1
20	TQ0047	A3R124	Gear Ratio - Input Shaft, R3.235:1	1
21	TQ0047	A3R125	Gear Ratio - Main Shaft, R3.235:1	1
22	TQ0046	A3R126	Gear Ratio - Input Shaft, R3.071:1	1
23	TQ0046	A3R127	Gear Ratio - Main Shaft, R3.071:1	1
24	TQ0045	A3R128	Gear Ratio - Input Shaft, R2.917:1	1
25	TQ0045	A3R129	Gear Ratio - Main Shaft, R2.917:1	1
26	TQ0119	A3R230	Selector Rod	1
27	TQ0120	A3R134	Rear Bearing Cover. (Input & Idler)	1
28			Coupling Heavy-duty(K7 Engine)	1
29	TQ0044	A3R136	Gear Ratio - Input Shaft, R2.7701 / R2.5081	1
30	TQ0044	A3R137	Gear Ratio - Main Shaft, R2.7701	1
31	TQ0121	A3R139	Stud - Gear Ratio Cover Plate	2
32			Coupling Heavy-duty (K8 Engine)	1
33		A3R148	Gear Ratio - Main Shaft, R2.5081	1
34		A3R149	Crownwheel, R2.321	1
35		A3R150	Forward Gear (Synchro) - Main Shaft.	1
36		A3R151	Idler Shaft (Incorporating 25T & 28T GEARS)	1
37	TQ0187	A3R152	Coupling (K8 Engine)	1
38	TQ0122	F72501	Differential	1
39	TQ0054	A1R203	Selector Fork	1
40	TQ0123	A1R115	Drive Hub	1
41	TQ0124	A1R116	Drive Disc (Synchro Engagement)	1
42	TQ0125	A1R120	Dog Ring (Synchro) Forward Gear - Input Shaft	1
43	TQ0126	A2R109	Bearing Cover	1
44	TQ0127	A2R114	Differential Bearing Retainer Long	1
45	TQ0128	A2R124	Spacer - Differential Front End	1
46	TQ0129	E3U128	Index Plunger	1
47	TQ0130	E3U127	Index Plunger Housing	1
48	TQ0131	E2G127	Filler Plug	3
49	TQ0132	E6G169	Hollow Dowel (to suit M10)	2
50	TQ0133	0042	Ball @ 1/8 Internal	2
51	TQ0134	0225	Ball @ 1/4	2
52	TQ0113	0242	Spring - Compression	1
53	TQ0135	0245	Bearing - Roller 35x40x17	1
54	TQ0145	0280	Circlip - External	2
55	TQ0136	0304	Bearing - Ball 30x62x20	2
56	TQ0057	0378	Oil Seal - 14x24x7	1
57		0389	Socket Head Capscrew M6x1.0x25 LG	4
58		0442	Socket Head Capscrew M6x1.0x16 LG	16
59	TQ0137	0546	Bearing - Ball 30x62x16	2
60		0596	Sellock Pin @ 4x22 LG	1
61	TQ0030	0616	Oil Seal - 42x55x8	1
62	TQ0138	0665	Bearing - Roller 40x45x17	1
63		0684	Socket Head Capscrew M8x1.25x20 LG	11
64	TQ0033	0748	Oil Seal - 40x62x7	2
65	TQ0053	0836	Reverse Light Switch	1
66	TQ0031	0861	Washer - 20mm bore with oil seal	3
67	TQ0143	0879	Washer - Schnorr type M6	23
68	TQ0144	0882	Washer - Schnorr type M8	11
69	TQ0283	0883	Magnet - Cylindrical @ 10x20 LG	1
70	TQ0149	0972	Washer - @ 14mm bore with oil seal	1
71		0991	Socket Head Capscrew M6x1.0x50 LG	3
72	TQ0139	1009	Bearing - Roller 30x62x20	1
73	TQ0039	1035	Breather 3/8 BSPT x19 TPI	1
74	TQ0148	1069	Washer - @ 12mm bore with oil seal	1
75	TQ0140	1184	Bearing - Ball 1.500x3.250x0.750	2
76	TQ0147	1206	Circlip - External (plain)	1
77	TQ0141	1209	Bearing - Roller 25x52x15	1
78	TQ0146	1210	Circlip - Internal (plain)	1
79	TQ0019	1362	Gasket - Paper (Front/Rear Casing Seal)	1
80	TQ0028	1363	O-Ring - (Gear Ratio Cover Plate)	1
81	TQ0110	1476	Crownwheel Bolt	6

SR8 GEAR CHART – HYPOID GEARBOX

@10,000rpm	SHORT	MEDIUM	LONG	EXTRA LONG
Gear	**Speed in KPH**	**Speed in KPH**	**Speed in KPH**	**Speed in KPH**
1st	109	109	109	109
2nd	149	149	149	149
3rd	170	178	178	178
4th	192	206	206	206
5th	214	229	237	237
6th	235	257	272	279

Mini Q-Tek HYPOID Gear															
Radical part #	**Quaife Input**	**Quaife Output**	**Gear**	**Input**	**Output**	**Short**	**Med.**	**Long**	**Ex Long**	**SR3 Ford**	**Ratio**	**MPH Std**	**KPH Std**	**MPH Std**	**KPH Std**
TQ0300	E-72G1-60	E-72G1-66	1st	12	34	1	1	1	1	1	2.83	69	111	49	78
TQ0301	E-72G1-61	E-72G1-67	2nd	14	29	1	1	1	1	1	2.07	95	152	67	107
TQ0302	E-72G1-72	E-72G1-76	3rd	16	29	1					1.81	109	174		
TQ0303	E-72G1-62	E-72G1-68	3rd	15	26		1	1	1		1.73	114	182		
TQ0304	E-72G1-73	E-72G1-77	4th	18	29	1				1	1.61	122	196	75	119
TQ0305	E-72G1-63	E-72G1-69	4th	18	27		1	1	1		1.50	131	210		
TQ0306	E-72G1-74	E-72G1-78	5th	18	26	1					1.44	136	218		
TQ0307	E-72G1-64	E-72G1-70	5th	20	27		1				1.35	146	233		
TQ0308	E-72G1-75	E-72G1-79	6th	19	25	1					1.32	150	239		
TQ0309	E-72G1-80	E-72G1-81	5th	20	26			1	1	1	1.30	155	248	106	170
TQ0310	E-72G1-65	E-72G1-71	6th	20	24		1				1.20	164	262		
TQ0311	E-72G1-45	E-72G1-51	6th	22	25			1			1.14	173	277		
TQ0312	E-72G1-82	E-72G1-83	6th	19	21				1		1.11	178	285		
TQ0410	E-72G1-11	E-72G1-12	5th	22	23					1	1.05			132	212
TQ0411	E-72G1-13	E-72G1-14	6th	23	20					1	0.87			159	255

RPE 6 SPEED TRANSAXLE GEAR RATIOS FOR RADICAL SR8 HYPOID AND NON-HYPOID

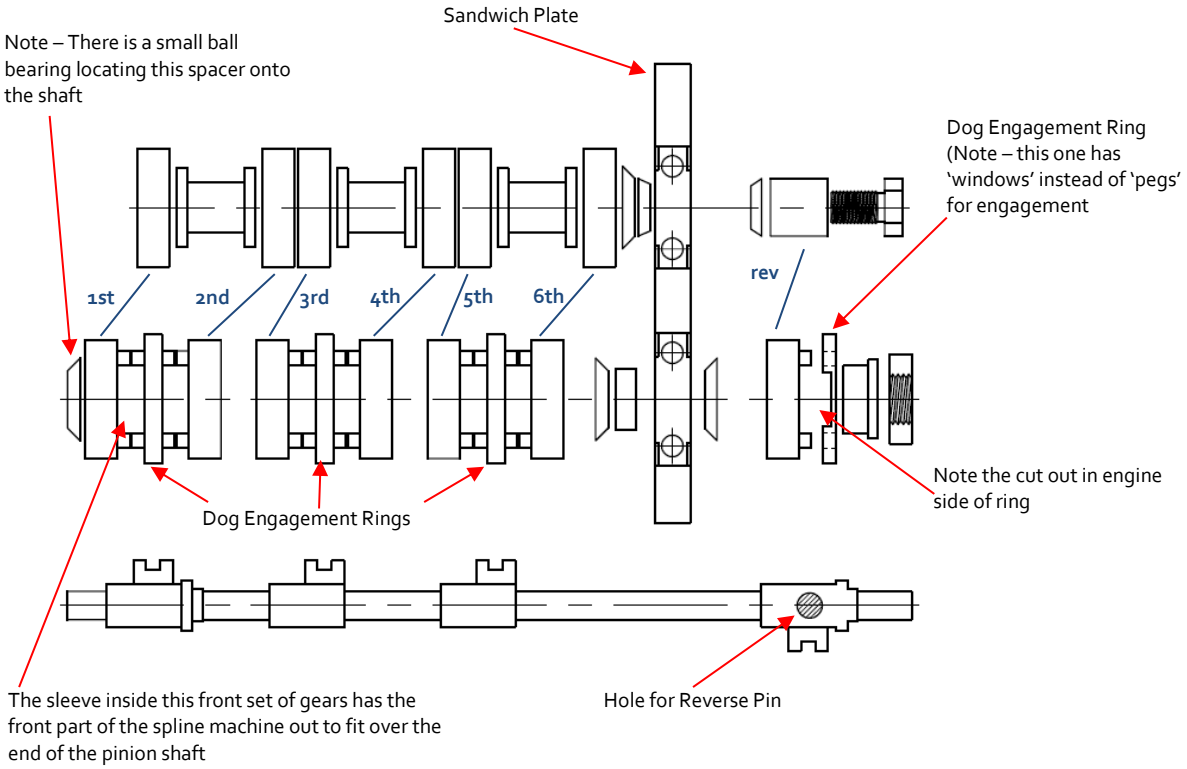
NON-HYPOID GEAR RATIO LIST:

SHORT RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
1st	10:26	TQ0164	Same on all three sets
2nd	13:25	TQ0165	Same on all three sets
3rd	17:28	TQ0152	
4th	17:25	TQ0153	
5th	19:25	TQ0154	
6th	20:24	TQ0163	
MEDIUM RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
3rd	17:27	TQ0159	
4th	16:22	TQ0160	
5th	21:26	TQ0150	
6th	18:20	TQ0151	
LONG RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
3rd	17:27	TQ0159	
4th	16:22	TQ0160	
5th	20:24	TQ0163	
6th	23:24	TQ0161	

HYPOID GEAR RATIO LIST:

SHORT RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
1st	12:34	TQ0300	Same on all sets
2nd	14:29	TQ0301	Same on all sets
3rd	16:29	TQ0302	
4th	18:29	TQ0304	
5th	18:26	TQ0306	
6th	19:25	TQ0308	
MEDIUM RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
3rd	15:26	TQ0303	Same as 3rd long & 3rd extra long
4th	18:27	TQ0305	Same as 4th long & 4th extra long
5th	20:27	TQ0307	
6th	20:24	TQ0310	
LONG RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
3rd	15:26	TQ0303	Same as 3rd long & 3rd extra long
4th	18:27	TQ0305	Same as 4th long & 4th extra long
5th	20:26	TQ0309	Same as extra long
6th	22:25	TQ0311	
EXTRA LONG RATIO SET			
Gear	**Ratio**	**Part No**	**Notes**
3rd	15:26	TQ0303	Same as 3rd long
4th	18:27	TQ0305	Same as 4th long
5th	20:26	TQ0309	Same as 5th long
6th	19:21	TQ0312	

Hypoid Gearboxes Have an 'H' Prefix After The Gearbox Number On The Tag



SR8 GEAR RATIO CHART – HYPOID – SHORT

Final Drive	8	30	0.2667	Hypoid		
Bevel Gear	1	1	1.0000			
Transfer gear	1	1	1.0000	Short		
Tyre Diam	0.614	Dunlop				
Max RPM	10000	Max 6th	10000			
Gear	In	Out	Ratio	Speed Mph	Speed Kph	Drop
1st	12	34	0.3529	68	109	
						2689
2nd	14	29	0.4828	93	149	
						1250
3rd	16	29	0.5517	106	170	
						1111
4th	18	29	0.6207	120	192	
						1034
5th	18	26	0.6923	134	214	
						891
6th	19	25	0.7600	147	235	

SR8 GEAR RATIO CHART – HYPOID – MEDIUM

Final Drive	8	30	0.2667	Hypoid		
Bevel Gear	1	1	1.0000			
Transfer gear	1	1	1.0000	Medium		
Tyre Diam	0.614	Dunlop				
Max RPM	10000	Max 6th	10000			
Gear	In	Out	Ratio	Speed Mph	Speed Kph	Drop
1st	12	34	0.3529	68	109	
						2689
2nd	14	29	0.4828	93	149	
						1632
3rd	15	26	0.5769	111	178	
						1346
4th	18	27	0.6667	129	206	
						1000
5th	20	27	0.7407	143	229	
						1111
6th	20	24	0.8333	161	257	

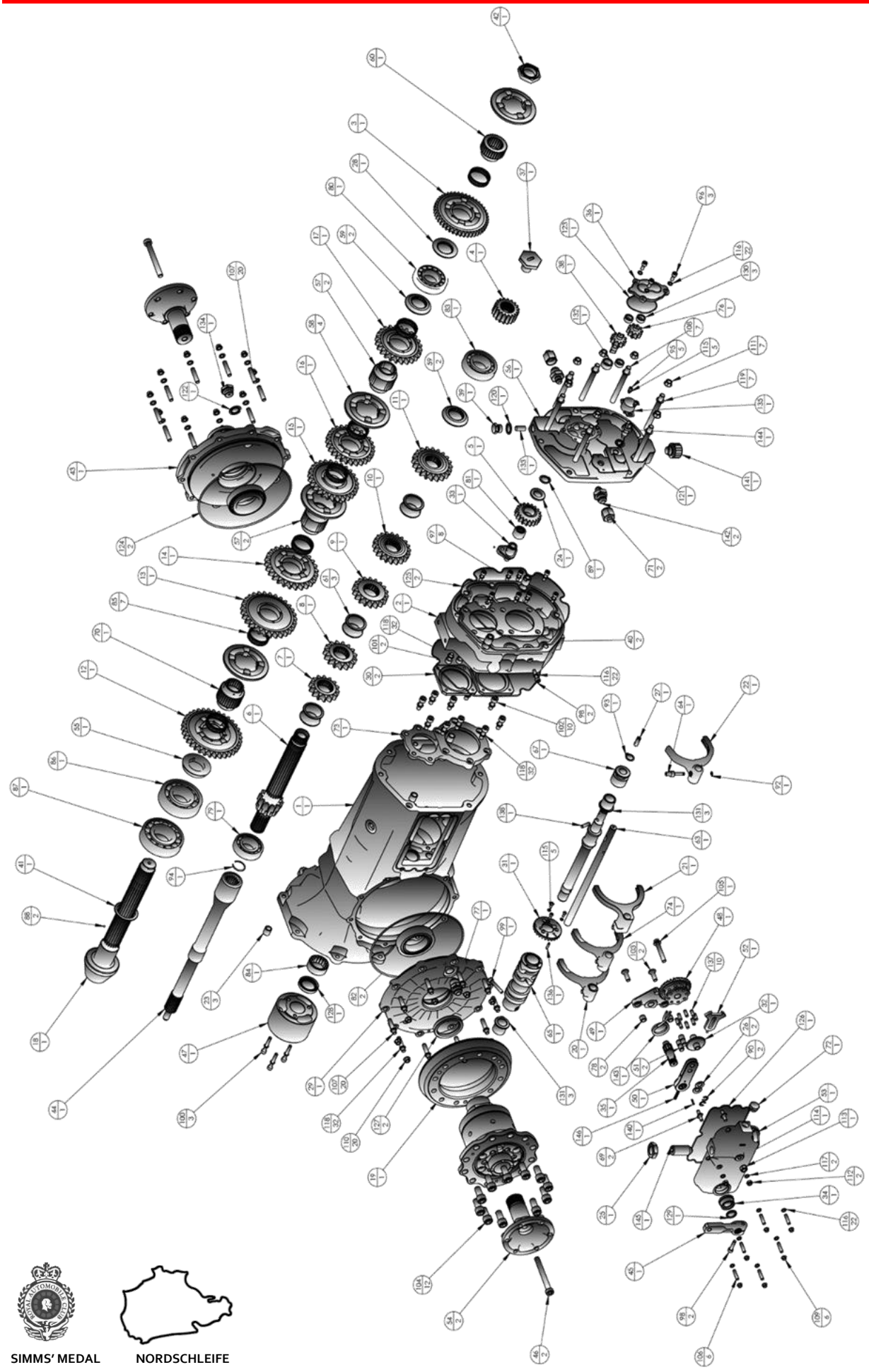
SR8 GEAR RATIO CHART – HYPOID – LONG

Final Drive	8	30	0.2667	Hypoid		
Bevel Gear	1	1	1.0000			
Transfer gear	1	1	1.0000	Long		
Tyre Diam	0.614	Dunlop				
Max RPM	10000	Max 6th	10000			
Gear	In	Out	Ratio	Speed Mph	Speed Kph	Drop
1st	12	34	0.3529	68	109	
						2689
2nd	14	29	0.4828	93	149	
						1632
3rd	15	26	0.5769	111	178	
						1346
4th	18	27	0.6667	129	206	
						1333
5th	20	26	0.7692	148	237	
						1259
6th	22	25	0.8800	170	272	

SR8 GEAR RATIO CHART – HYPOID – EXTRA LONG

Final Drive	8	30	0.2667	Hypoid		
Bevel Gear	1	1	1.0000			
Transfer gear	1	1	1.0000	Extra Long		
Tyre Diam	0.614	Dunlop				
Max RPM	10000	Max 6th	10000			
Gear	In	Out	Ratio	Speed Mph	Speed Kph	Drop
1st	12	34	0.3529	68	109	
						2689
2nd	14	29	0.4828	93	149	
						1632
3rd	15	26	0.5769	111	178	
						1346
4th	18	27	0.6667	129	206	
						1333
5th	20	26	0.7692	148	237	
						1498
6th	19	21	0.9048	175	279	

SR8 (HYPOID) GEARBOX – EXPLODED DRAWING



SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

SR8 GEARBOX PARTS LIST

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

Item #	Radical Part #	Supplier Part #	Description	Qty
1	TQ0316	E58G103	Bearing Plate	1
2		E58G105	End Cover	1
3	TQ0164	E58G140	1st Gear - Input (R.2600:1)	1
4		E58G141	2nd Gear - Input	1
5	TQ0159	E58G142	3rd Gear - Input	1
6	TQ0160	E58G143	4th Gear - Input	1
7	TQ0163	E58G144	5th Gear - Input	1
8	TQ0161	E58G145	6th Gear - Input	1
9	TQ0164	E58G246	1st Gear - Output	1
10		E58G247	2nd Gear - Output	1
11	TQ0159	E58G248	3rd Gear - Ouput	1
12	TQ0160	E58G249	4th Gear - Ouput	1
13	TQ0163	E58G250	5th Gear - Ouput	1
14	TQ0161	E58G251	6th Gear - Output	1
15	TQ0186	E58G252	Reverse Gear - Output	1
16	TQ0199	E58G153	Reverse Gear - Input	1
17	TQ0223	E58G181	Pinion - Spiral Bevel (R.4111:1)	1
18	TQ0325	E58G3102	Inner Track (Splined Hub)	2
19	TQ0162	E58G2103	Drive Disc (Dog-ring)	4
20	TQ0323	E58G1104	Thrust Washer	2
21	TQ0193	E58G2106	Inner Track (Reverse Gear)	1
22	TQ0352	E58G1107	Spacer - Input Shaft	3
23	TQ0168	E58G2108	Selector Fork - 5th/6th	1
24	TQ0274	E58G2110	Camdrum Spindle	1
25		E58G2112	Reverse Track (Normal Rotation)	1
26		E58G2112A	Reverse Track	1
27	TQ0170	E58G1113	Selector Fork Support Rod	1
28	TQ0191	E58G2115	Reverse Fork Pin	1
29	TQ0192	E58G2116	Selector Fork - Reverse	1
30	TQ0270	E58G1119	Camdrum (6 Speed Reverse Rotation)	1
31	TQ0249	E58G1126	Index Screw	1
32	TQ0240	E58G1128	Ratchet Claw Stop	2
33	TQ0215	E58G1129	Selector Fork - 3rd/4th	1
34	TQ0317	E58G1130	Inner Track (Splined Hub)	1
35		E58G1EX02	Flare Cap - (5929-06)	2
36	n/a	n/a	n/a	n/a
37	TQ0132	E6G169	Hollow Dowel (M10)	3
38	TQ0341	E15G121	Thrust Washer - Reverse Idler	1
39		E18G164	Housing - Guide Tube	1
40		E18G165	Guide Tube	1
41		E18G466	Slider/Piston	1
42		E18G1176	Fulcrum Ring	1
43		E25G1181	Clutch Unit Spacer	1
44		E32G1118	Washer	2
45	TQ0241	E33G173	Interlock Housing Cap	1
46	TQ0272	E34G144	Sensor Drive Plug	1
47	TQ0268	E34G1112	Thrust Washer - Reverse Gear O/P Shaft	1
48	n/a	n/a	n/a	n/a
49		E42G203	Main Casing	1
50		E42G1093	Crown Wheel - Spril Bevel R4.111:1	1
51	TQ0351	E42G1108	Bearing Retainer Cap	2
52	TQ0214	E42G2111	Selector Fork - 1st/2nd & 3rd/4th	1
53		E42G1115	Drum Bush Flange	1
54	TQ0271	E42G1119	Drum Bevel Gear	1
55	TQ0236	E42G1121	Spool Geal Spindle	1

Item #	Radical Part #	Supplier Part #	Description	Qty
56	TQ0198	E42G2122	Reverse Idler Spindle	1
57	TQ0366	E42G2123	Bush - Gear Change Spindle	1
58	TQ0230	E42G1124	Operating Spindle	1
59		E42G2128	Crownwheel Bearing Retainer Plate	1
60	TQ0227	E42G1183	Cable Operating Arm	1
61	TQ0383	E42G1132	Oil Pump Cover	1
62	TQ0217	E42G3135	Shaft Clamp Screw	1
63	TQ0237	E42G1139	Interlock Plunger Neutral	1
64	TQ0220	E42G2140	Pump Gear Drive	1
65	TQ0355	E42G1152	Threaded Dowel	2
66	TQ0282	E42G1151	End Case Bung	1
67	TQ0371	E42G1153	Pinion Spacer	1
68	TQ0228	E42G1154	Nut - Output Shaft	1
69		E42G1162	Cover - Diff Retainer	1
70	TQ0208	E42G1165	Ball Bearing	1
71		E42G1167	Cover - Diff Retainer	1
72	TQ0298	E42G2179	Input Shaft	1
73		E42G1187	Flange Retaining Bolt	2
74	TQ0234	E42G1203	Bevel Gear Spool	1
75	TQ0239	E42G1213	Clamp Plate Return Spring	1
76	TQ0251	E42G1214	Ratchet Arm Lever	1
77	TQ0235	E42G1215	Ratchet Pin	2
78	TQ0224	E42G1216	Ratchet Claw	1
79	TQ0233	E42G1218	Gear Change Cover	1
80	TQ0197	E43G1017	Reverse Idler Gear	1
81		E52G155	Thrust Washer 1st Gear Output	1
82	TQ0324	A3R142	Oil Pump Gear (Driven)	1
83	n/a	n/a	n/a	n/a
84	TQ0242	F5F107	Hollow Dowel	2
85		QDF2Q	Differential	1
86	TQ0356	209	Bolt	11
87	TQ0134	225	Ball Bearing	2
88	TQ0171	317	Circlip 18mm	1
89		389	Bolt	2
90		442	Bolt	3
91	TQ0026	450	Roller Bearing	1
92	TQ0246	455	Circlip	2
93		471	Bolt	2
94	TQ0219	475	Gearbox Oil Seal	2
95		480	Bolt	1
96		507	Bolt	5
97	TQ0255	519	Bolt	7
98	TQ0218	584	Gearbox Oil Seal	1
99		595	Sellock Pin	1
100		609	O-Ring Seal	1
101		684	Bolt	10
102		758	Nut - Nylock M6	2
103		775	Bolt	2
104	TQ0295	797	Bush	2
105		801	Bolt	2
106		817	Washer	1
107	TQ0245	831	Dowel	12
108	TQ0221	838	Roller Bearing	1
109	TQ0201	842	Roller Bearing	1
110	TQ0229	870	Taper Roller Bearing	2

Item #	Radical Part #	Supplier Part #	Description	Qty
111	TQ0143	879	Schnorr Washer M6	22
112	TQ0144	880	Schnorr Washer M8	30
113		881	Schnorr Washer M10	15
114	TQ0283	883	Magnet End Case Bung	1
115	TQ0202	939	Dowel	1
116		971	Nut - Nyloc M8	1
117		988	Bolt	1
118	TQ0200	1003	Gearbox Bearing	1
119	TQ0294	1013	Bearing	1
120		1022	Circlip - Internal	1
121	TQ0039	1035	Gearbox Oil Breather	1
122		1070	Washer	2
123	TQ0287	1071	Oil Seal	1
124		1109	Schnorr Washer M4	7
125	TQ0247	1124	Washer	2
126	TQ0205	1156	Roller Bearing	7
127	n/a	n/a	n/a	n/a
128	TQ0203	1240	Circlip	1
129		1261	Washer	1
130	TQ0344	1271	Bush	3
131	TQ0296	1295	Bush	2
132	TQ0273	1296	Dowel	1
133	TQ0361	1297	Bush	1
134		1310	Bearing	1
135	TQ0243	1389	Bolt	2
136	TQ0244	1399	Bolt	1
137	TQ0348	1441	Dowty Seal	1
138	TQ0209	1451	Roller Bearing	1
139	TQ0276	1454	Plug	2
140	TQ0326	1460	Stud	20
141	TQ0248	1463	Stud	6
142	TQ0211	1465	Stud	7
143		1466	Nut - Kaylock M10	7
144		1467	Nut - Kaylock M8	20
145		1468	Nut - Kaylock M6	6
146		1469	Washer	2
147		1488	O-Ring	1
148		1489	O-Ring	1
149		1490	O-Ring	1
150		1584	Hose Union	2
151				
152				
153				
154				
155				
156				
157				
158				
159				
160				
161				
162				
163				
164				
165	TQ0225	1641	Ratchet Spring	1
166	TQ0194	1732	Circlip External	1

RXC GEARBOX RATIO CHART AND PART NUMBERS

RXC V6 STRAIGHT CUT RATIOS

PART NO.	DESCRIPTION	INPUT	OUTPUT	RATIO
E81G220	INPUT SHAFT INC 1ST & REV			
E81G130	1ST GEAR O/P		39T	2.438:1
E81G121/E81G131	2ND GEAR	18T	34T	1.889:1
E81G122/E81G132	3RD GEAR	20T	30T	1.500:1
E81G123/E81G133	4TH GEAR	21T	26T	1.238:1
E81G124/E81G134	5TH GEAR	23T	24T	1.043:1
E81G125/E81G135	6TH GEAR	29T	26T	0.897:1
E81G2133/E81G1137	7TH GEAR	30T	25T	0.833:1
E81G243	OUTPUT SHAFT		18T	3.056:1
E81G1121	CROWNWHEEL GEAR		55T	3.056:1
V6 OIL PUMP STRAIGHT CUT 16 TOOTH				

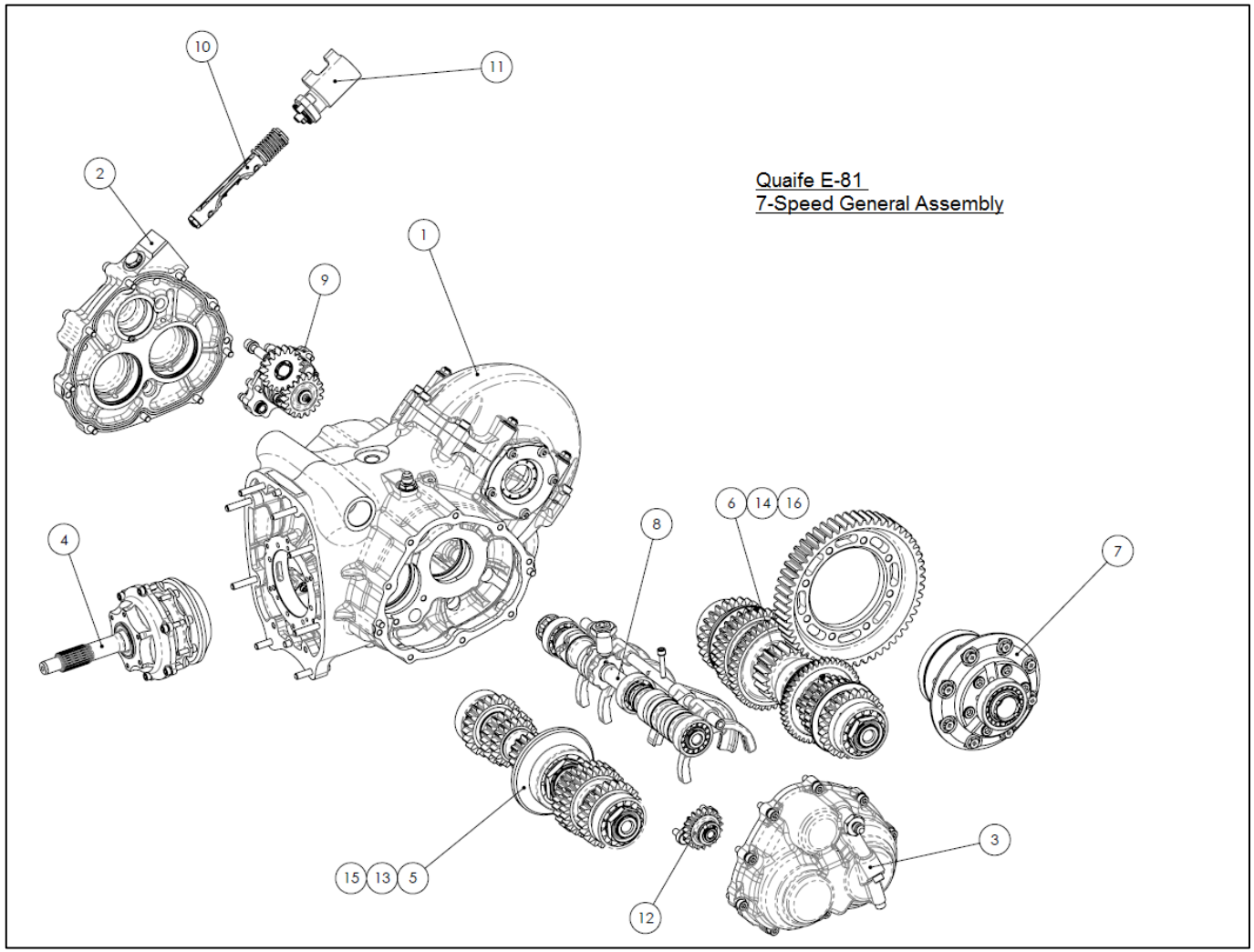
RXC V6 HELICAL CUT RATIOS

PART NO.	**DESCRIPTION**	**INPUT**	**OUTPUT**	**RATIO**
E81G2101	INPUT SHAFT INC 1ST & REV			
E72G1126	1ST GEAR O/P		43T	2.867:1
E72G1121/E72G1127	2ND GEAR	19T	39T	2.053:1
E72G1122/E72G1128	3RD GEAR	23T	37T	1.609:1
E72G1123/E72G1129	4TH GEAR	26T	34T	1.308:1
E72G1124/E72G1130	5TH GEAR	29T	31T	1.069:1
E72G1125/E72G1131	6TH GEAR	32T	28T	0.875:1
E81G2101/E81G1103	7TH GEAR	34T	26T	0.765:1
E81G1105	OUTPUT SHAFT		23T	3.130:1
E81G1105	CROWNWHEEL GEAR		72T	3.130:1
V6 OIL PUMP HELICAL CUT				

RXC V8 STRAIGHT CUT RATIOS

PART NO.	**DESCRIPTION**	**INPUT**	**OUTPUT**	**RATIO**
E81G2153	INPUT SHAFT INC 1ST & REV			2.833:1
E72G166	1ST GEAR O/P		32T	2.8:33
E72G161/E72G167	2ND GEAR	14T	29T	2.071:1
E72G162/E72G168	3RD GEAR	15T	26T	1.733:1
E72G163/E72G169	4TH GEAR	18T	27T	1.500:1
E72G180/E72G181	5TH GEAR	20T	26T	1.300:1
E72G145/E72G183	6TH GEAR	22T	25T	1.136:1
E72G1111/E72G1112	7TH GEAR	22T	23T	1.045:1
E81G2138	OUTPUT SHAFT		15T	4.067:1
E81G1139	CROWNWHEEL GEAR		61T	4.067:1
V8 OIL PUMP 13 TOOTH				

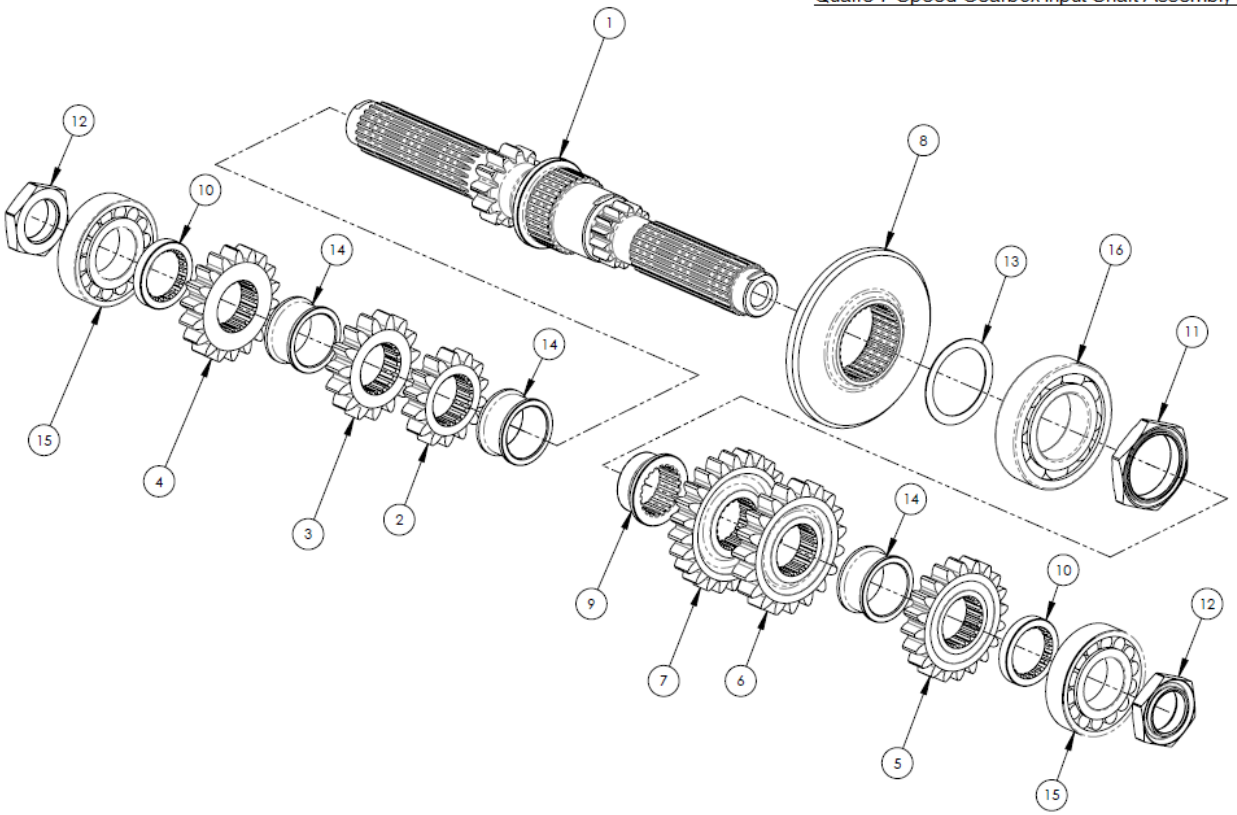
RXC 7-SPEED – EXPLODED DIAGRAM



SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

Quaife 7 Speed Gearbox Input Shaft Assembly RPE V8 Spur Ratios

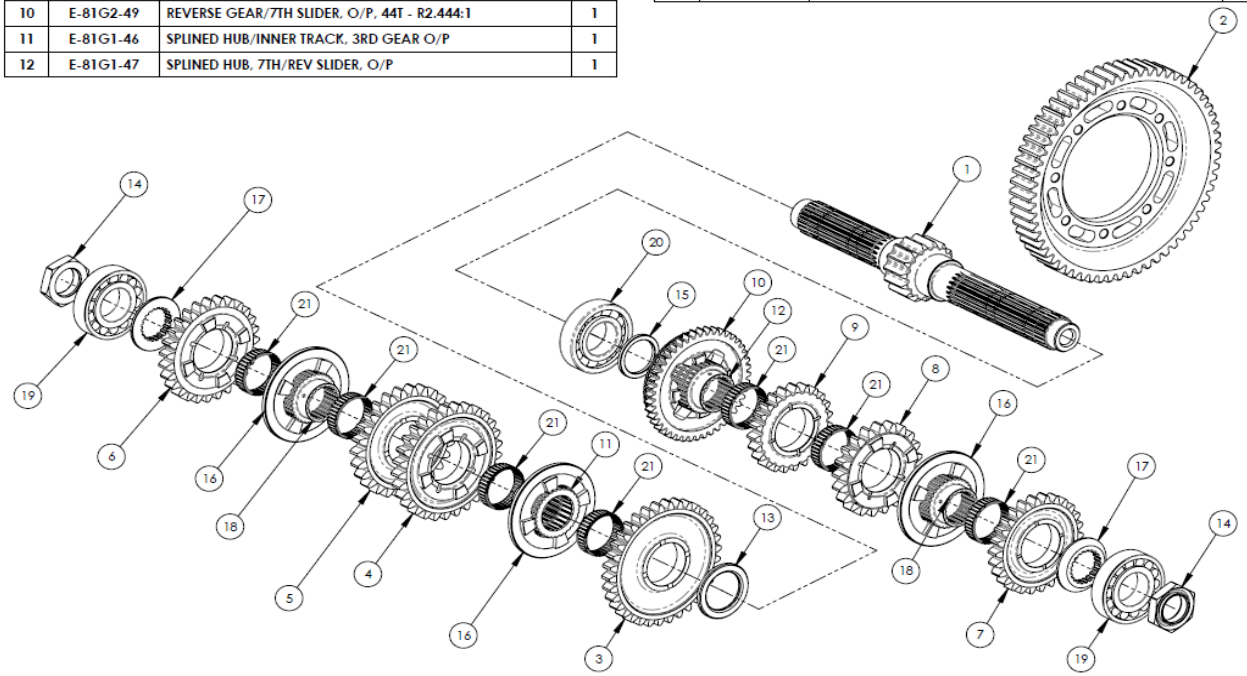


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	E-81G2-153	INPUT SHAFT INC 1ST & REV	1
2	E-72G1-61	2nd GEAR I/P, 14T - R2.071:1	1
3	E-72G1-62	3rd GEAR I/P, 15T - R1.733:1	1
4	E-72G1-63	4th GEAR I/P, 18T - R1.500:1.	1
5	E-72G1-80	5th GEAR I/P - 20T, R1.300:1	1
6	E-72G1-82	6th GEAR I/P, 19T - R1.105:1	1
7	E-81G1-132	6TH GEAR, I/P, 24T - R0.958:1	1
8	E-81G2-41	BEVEL GEAR OUTPUT (WHEEL)	1
9	E-81G2-44	SPACER, 7TH GEAR, I/P SHAFT	1
10	E-81G1-45	SPACER, BEARING, I/P SHAFT	2
11	E-81G1-69	NUT, M45x1.5, I/P SHAFT BEARING	1
12	E-81G2-149	NUT O/P SHAFT - R.H.	2
13	E-81G1-154	BEVEL GEAR SPACER 58x46x0.762	1
14	E-58G1-107	SPACER - INPUT SHAFT 1st/2nd, 3rd/4th, 5th/6th	3
15	958	BEARING - ROLLER 35x72x17	2
16	1005	BEARING - BALL 4 POINT 45x85x19	1

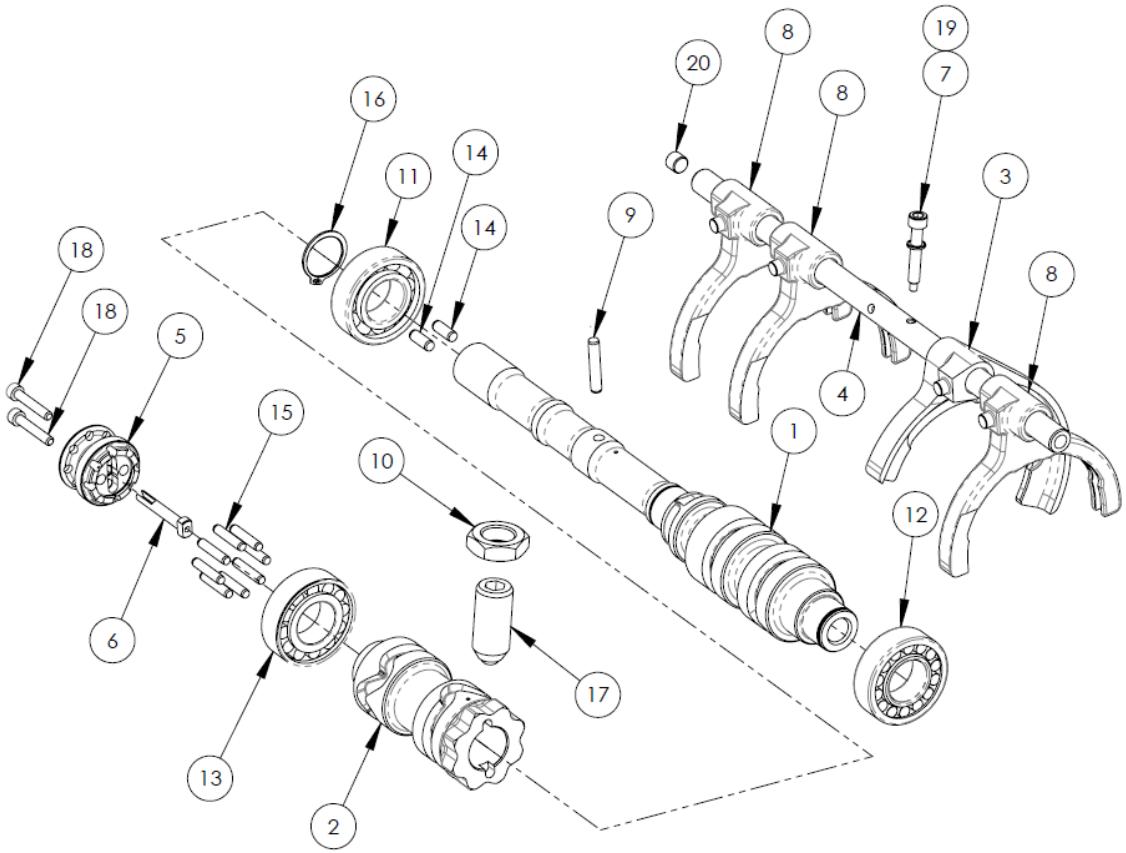
Quaife 7 Speed Gearbox Output Shaft Assembly RPE V8 Spur Ratios

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	E-81G1-138	OUTPUT SHAFT, 15T - R4.067:1	1
2	E-81G1-139	CROWNWHEEL GEAR, 61T - R4.067:1	1
3	E-72G1-66	1st GEAR O/P, 34T - R2.833:1	1
4	E-72G1-67	2nd GEAR O/P, 29T - R2.071:1	1
5	E-72G1-68	3rd GEAR O/P, 26T - R1.733:1	1
6	E-72G1-69	4th GEAR O/P, 27T - R1.500:1	1
7	E-72G1-81	5th GEAR O/P, 26T - R1.300:1	1
8	E-72G1-83	6th GEAR O/P, 21T - R1.105:1	1
9	E-81G1-136	6TH GEAR, O/P, 23T - R0.958:1	1
10	E-81G2-49	REVERSE GEAR/7TH SLIDER, O/P, 44T - R2.444:1	1
11	E-81G1-46	SPLINED HUB/INNER TRACK, 3RD GEAR O/P	1
12	E-81G1-47	SPLINED HUB, 7TH/REV SLIDER, O/P	1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
13	E-81G1-48	THRUST WASHER - REV. GEAR O/P SHAFT	1
14	E-81G2-149	NUT O/P SHAFT - R.H.	2
15	E-81G2-144	SPACER, 4-POINT BEARING, 4mm - OUTPUT SHAFT	1
16	E-58G2-103	DRIVE DISC	3
17	E-58G1-104	THRUST WASHER 6TH GEAR O/P SHAFT - I/P SHAFT	2
18	E-58G1-130	SPLINED HUB/INNER TRACK 1st/2nd GEARS	2
19	958	BEARING - ROLLER 35x72x17	2
20	1003	BEARING - BALL 4 POINT 35x72x17	1
21	1156	BEARING - ROLLER 40x45x13	7



Camdrum/Gear Selector Assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	E-81G1-63	CAM DRUM - 5TH, 6TH, 7TH, REV	1
2	E-81G1-64	CAM DRUM, 1st/2nd AND 3rd/4th GEAR	1
3	E-81G1-66	SELECTOR FORK, 7TH/REV	1
4	E-81G1-67	SELECTOR ROD/SPRAY BAR	1
5	E-81G2-151	GEARCHANGE SPOOL - PUSH/PULL GEARCHANGE	1
6	E-81G1-152	POTENTIOMETER PIN	1
7	E-81G1-76	MODIFIED SOCKET HEAD CAPSCREW M6x1.0x40 LG	1
8	E-61G1-104	SEL FORK - 1st/2nd, 3rd/4th, 5th/6th	3
9	E-60G1-107	MODIFIED DOWEL ∅6x32 LG	1
10	E-16G2-72	M20x2.5 NUT	1
11	373	BEARING - BALL 25x52x15	1
12	449	BEARING - ROLLER 25x52x15	1
13	1209	BEARING - ROLLER 25x52x15	1
14	831	DOWEL ∅6x16 LG	2
15	2273	DOWEL ∅5x25 LG	8
16	1164	CIRCLIP - EXTERNAL	1
17	1574	SPRING PLUNGER, BALL END WITH HEX.	1
18	649	SOCKET HEAD CAPSCREW M5x0.8x30 LG	2
19	1124	WASHER - DOWTY SEAL M6	1
20	1969	PLUG - TAPER 1/8 BSPT	1

RADICAL GEARBOX RUNNING IN INFORMATION

All new gears are lapped at manufacture. However, they are not lapped under the same pressures that driving creates. The loads generated while driving force any microscopic high spots on the gear teeth back into the surface of the metal. This is called "work hardening". Work hardening is similar to forging in the way that it compresses the metal molecules into a very compact and hard formation.

Running in procedure:

1. Keep the vehicle at speeds below 60% for the first 30 minutes of running.

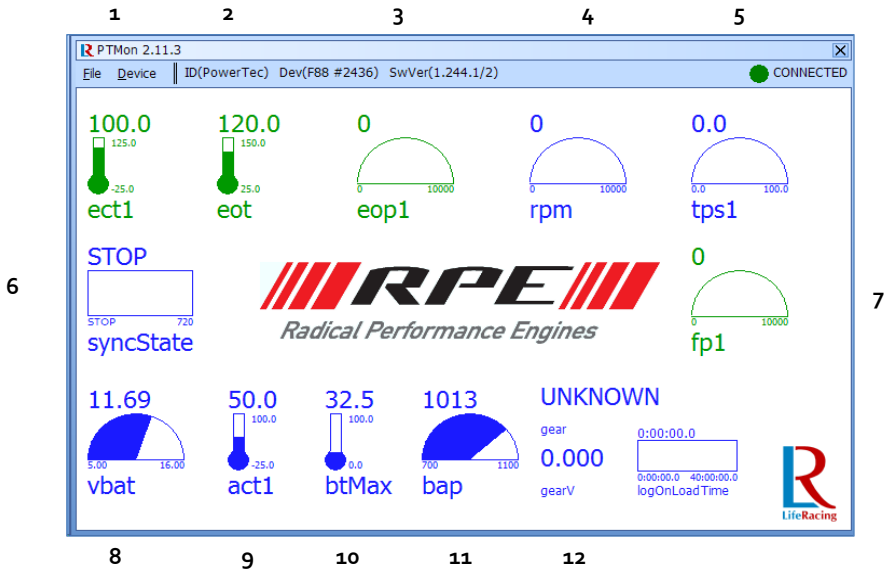
2. It helps to stop to let the gearbox cool for 15 minutes before continuing.

3. Build this up throughout the day, with increases of speed and load percentage of 10% every 30 minutes of running.

   ➔ i.e 60% for first 30 minutes, 70% for next 30 minutes, 80% for next 30 etc. This is necessary because not all of the gear tooth's are making contact until it is heavily loaded.

When driving, the teeth flex to contact completely, and cause the previously unloaded portion of the teeth to touch and work harden. It is very easy to damage the ring & pinion by overloading before the teeth are broken-in. If you take it easy on a new ring & pinion and keep it full of high quality oil, it will last a lot longer.

PTMON – SCREEN LAYOUT



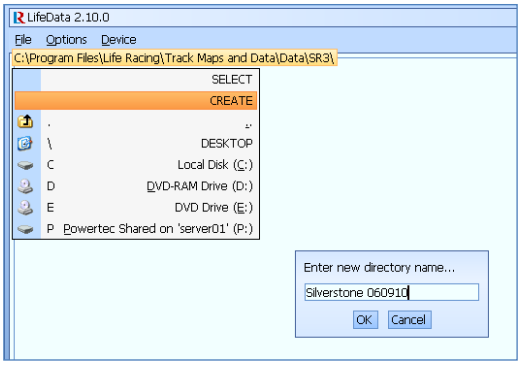
1. Engine coolant temperature (ect1) – changes from red to green when in correct range of 60°C to 95°C
2. Engine oil temperature (eot) – changes from red to green when in correct range of 50°C to 120°C
3. Engine oil pressure (eop1) – At idle, 70 psi when cold /20 psi when hot
4. Engine rpm (rpm) – Engine should idle between 1500 and 1800rpm
5. Throttle position sensor (tps1) – needs to be set to 4% at idle
6. Engine sync state – should be at 720° when engine is running, turns green when correct
7. Fuel pressure (fp1) – changes from red to green when in correct range 2.8 bar to 3.2 bar
8. Battery voltage (vbat) – above 12.5 volts when engine is running
9. Air charge temperature sensor (act1) – air inlet temperature
10. Engine ECU temperature (btMax) – temperature of the engine ECU
11. Baro sensor pressure (bap) – below 1030 mBar
12. Gear Indicator – Should be Neutral when starting. Gear position voltage displayed for technical use

Life Data is used to download the engine data from the ECU's internal memory to a PC. The instructions below explain how to do this.

1. Connect a computer to the ECU/car and turn both the ignition and master switches on to power up the ECU.
2. A working directory now needs to be created. This selects the folder in which the data will be stored once it has been downloaded, and sets a route to find the information. It contains the name of the driver and/or car number etc. For example C:\Program Files\Life Racing\Track Maps & Data\SR3 (SR5, SR8)\Customer\ Track & Date.
3. Open the Life Data icon on your desktop.
4. Select F for file, then W for working directory.
5. At the top of the screen, below the toolbar will be;

   C:\Program Files\Life Racing\Track maps & Data

   If not, correct this part by selecting the full stop button… it goes back one section. Then by selecting "create", a box comes up with "enter new directory name". Enter the appropriate information, such as car type, chassis number, circuit and date. Once this is done, press Enter.



   If on the other hand this has been set up the next part will be in the drop down box i.e. Track maps & Data, SR3 or SR5 or SR8, customer name, track & date. All you then need to do is select the appropriate item until it is complete.

6. Highlight "select" & press return.
7. A box comes up with "there is no LR directories config file at: - Create one – select Yes.
8. Another box with "place shortcut on desktop" select No.
9. Then select D for device and R for read data.
10. In the next box select ok. If this data needs to be looked at, load up Life View, click on File, Load and then find as above the appropriate file. Once you have loaded up a data file, the channels will be listed down the right hand side of the screen, to display a channel highlight it using the arrows on the keyboard and press enter.

    If the data needs to be e-mailed go through My computer, Program Files, Life Racing, Track maps & Data, SR3/SR5/SR8, customer, track & date select file or files to be e-mailed.

Act1

Air charge temperature.
This is the sensor in the airbox. This should be a constant line without large variations in reading (spiking). If this sensor has failed it will read 10°c.

Bap

Barometric air pressure.
This sensor is mounted near the engine ECU. It measures atmospheric pressure and compensates the calibration for altitude and air pressure. This should be a constant line also without large variations in readings (spiking). If this sensor has failed it will read 1013

Btmax

ECU internal temperature.

Clutch switch.

This is the button mounted onto the steering wheel. (Neutral button)

Ect1

Engine Coolant Temperature.
Minimum temperature before driving should be 50°c. When the car is running on the track, a minimum temperature of 70°c should be seen. If required, tape should be placed over a section of the radiator to increase the temperature. If this is required, then the temperature throughout the day should be monitored to ensure the engine temp is around 85°c.
Maximum driving water temperature should not be over 95°c.

Engineenable

This is used to show when the eop1trip has stopped the engine (or any other trip)

Eop1

Engine Oil Pressure
The oil pressure trace should follow a similar profile to engine rpm. With the engine on power and above 9000rpm the oil pressure should not go below 50psi. If the oil pressure drops against engine revs, Powertec should be contacted and data sent.

If a drop is seen, then it is generally indicating low oil level in the oil tank or oil loss.

Eopt1trip

this shows where the threshold is for the oil pressure trip. If the oil pressure drops below this line for more than 1 second, the engine will turn off automatically.

Eot

Engine Oil Temperature
Minimum on load oil temperature should be 50°c and a maximum of 130°c. Normal running temperature should be around 105c.

Fp1

Fuel Pressure
This should be no higher than 3.5 bar and no lower than 2.5 bar with the engine running.

Gear

This shows what gear the gearbox is in at the time.

Gearbliprequest

This shows the request sent from the ECU to blipper solenoid.

Gearblipstate

This shows what signal the calibration is sending to the blipper solenoid.

Gearcutdogkickcount

Shows the number of times the ECU has had to briefly re-instate the power to "kick" the gear off the dogs.

Gearcutrequest	This shows when the paddle switch has asked for a gearcut to change gear. If you experience gear changing problems, then this can be monitored to ensure that the LIFE engine ECU is receiving a gear cut signal.
Gearcutstate	This show what state the cut is in, in relation to what has been set in the calibration.
Geardownshiftoutput	This shows the output signal from the ECU to the downshift solenoid.
Gearshiftdecision	This is a good thing to check if you are having gear change issues, as this show you if the shift has been ignored by the ECU, and shows you why it ignored it.
Gearupshiftoutput	This shows the output signal from the ECU to the downshift solenoid.
Gearshiftstate	Shows you what state the gearshift is in, in relation to the calibration.
Gearv	This shows the voltage that the gear position sensor is seeing, in relation to the selector barrel movement.
Gsp	Gear system pressure. This shows the pressure in the air tank.
Gspcontrol	This shows the signal from the ECU to the compressor motor.
Lam1 **Paddleswitch**	This shows the reading from the exhaust lamba sensor (if fitted) this shows the input signal from the steering wheel paddles. I.e. which paddle the driver has used.
Revlimitactive	This shows when the rev limiter has been activated.
Rpm	Engine Speed If constant over-revs are seen (over 10,500 rpm), then the driver needs to be advised to adjust his driving style as this is causing damage to the engine. An over-rev should be no more than 10,800 maximum. Anything over this, then Powertec should be contacted.
Runmode	This shows whether the engine is running, stopped, cranking etc.
Runtime	This show the engine run time per session i.e. from when the engine is started, to when it is turned off.
Syncstate	This shows the state of the injector firing. It can also be used to check whether the crank and camshaft position sensors are working. If the camshaft sensor is not working, then the syncstate will show 360.
Tps1	Throttle Position Sensor This should be constant in relation to the driver's throttle input. Also at idle, this should be set to 4.0
Tpsclosed	this shows when the tps is in it closed position.
Vbat	Battery Voltage. This shouldn't drop below 11 volts when on load.

LIFE VIEW SOFTWARE

Life View is used to view engine data which has been downloaded from the ECU to a PC.

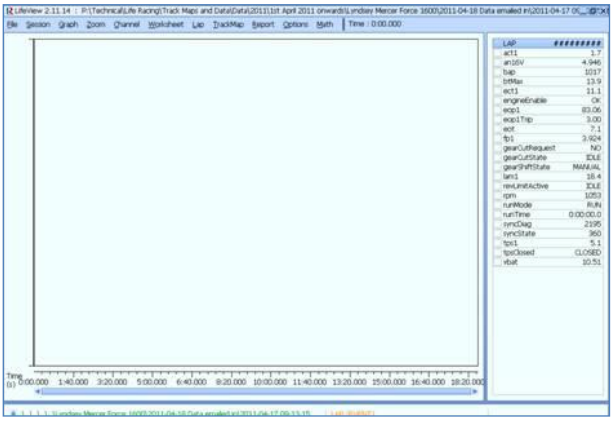
Once you have downloaded the data using LifeData following the download instructions on the previous page, the data which is extracted from the ECU will be saved in the 'Working Directory' folder you set up.

There are two types of files that the computer extracts from the ECU. These are session files which have the extension .LRD and logbook files which have the extension .LB.

The session files contain the data from a particular run or outing (from when the engine is started to when the engine stops). The time and date that the session began is in the name of the session file. The session files contain a trace of all the channels recorded, such as oil pressure, coolant temperature, throttle position etc.

To view the data, load LifeView. Once it has loaded, press F for file and L for load. Then find the data you are trying to open (which will be in the working directory you set up before you downloaded it). When you get to the data, you should see a list of session files. Highlight the one you want to load up and press enter to load it.

When the session file opens, you should see a screen like this:



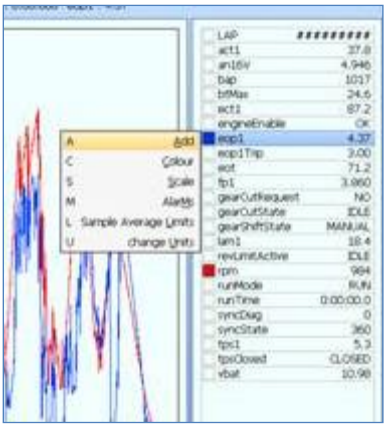
The logged channels are listed down the right hand side. To display a trace of a channel, scroll down the list to the channel you want to view using the up and down arrow and then press enter to display a trace of the channel.

Some of the names are abbreviated;

eop1 = *Engine oil pressure,*
ect1 = *Engine coolant temperature etc.*

You can load up as many of these channels as you like, in order to overlay them on each other.

The colour of the trace and scale of the channels axis can be changed by right clicking on the channel in the list on the right hand side, as shown to the right.



The logbook file contains quite a lot of information. It has an overall record which records some important minimum and maximum values that the engine has reached and the total time the engine has been running for since it was built or re-built.

The logbook also records some important minimum and maximum values for each session that the engine has run.

Loading up a logbook is similar to loading up a session file. When in LifeView, press F for File and B for LogBook. The logbook will be stored in the same folder as the session files, so navigate to that folder. When you get there, the logbook will not show up in the menu but if you scroll to select using the up and down arrows, details of the logbook will come up, as shown in the picture below. Press Enter to load the logbook.

LIFE ECU PARAMETERS EXPLAINED (ALL MODELS)

	V8	3.7 N/A	3.5TT	1500
Expected Running EOT	100°C	100°C	100°C	100°C
Expected Running ECT1	75°C	85°C	110°C	85°C
Expected Running ECT2	75°C	N/A	95°C	N/A
ECT1	Bank B	Dry Head Temp	Dry Head Temp	Wet Heat Temp
ECT2	Wet Water Temp	N/A	Wet Water Temp	N/A
Expected Running EOP	75psi	80psi	65psi	75psi
Expected Running FP	4Bar[1]	4Bar	4Bar	3Bar
Expected Running DIP	N/A	N/A	170Bar	N/A
Expected Running MAP	N/A	N/A	2Bar	N/A
Expected Running ACT	N/A	N/A	55°C	N/A
Min DIP Enable	N/A	N/A	50Bar	N/A
Fan On	88°C	90°C	90°C	92°C
Fan Off	85°C	80°C	80°C	90°C
Water Pump On	88°C	N/A	N/A	5°C
Water Pump Off	85°C	N/A	N/A	1°C
Charge Cooler On	N/A	N/A	5°C[2]	N/A
Charge Cooler Off	N/A	N/A	1°C[2]	N/A
Fan 1	Rad Fan LH	Rad Fan	Rad Fan LH & Water Pump	Rad Fan
Fan 2	Rad Fan RH	N/A	Charge Cooler	Water Pump
Fan 3	N/A	N/A	Suspension Lifter	N/A
Fan 4	Water Pump	N/A	N/A	N/A
Air Conditioning	N/A	Rad Fan RH	Rad Fan RH	N/A
ECU	F88DBW4	F88DBW4	F90RX	F88
VVT	No	Yes	Yes	No
Knock Control	No	Yes	Yes	No
Drive By Wire Option	Jenvey	OEM	OEM	N/A
ECT Trip	120°C 5sec	120°C 1sec	115°C (ECTmax) 1sec Limp Mode	120°C (ECTmax) 5sec Limp Mode
EOT Trip	N/A	N/A	N/A	N/A
FP Trip	2.2Bar 2sec[3]	3Bar 0.5sec	2.3bar 075sec	2.2Bar 2sec[3]
EOP Trip	50psi	60psi	50psi	40psi 10000rpm
Lean On-Load Trip	N/A	N/A	Limp Mode	N/A
Limp Mode	12% TPS Max[4]	12% TPS Max	20% TPS Max	N/A
Rev Cut	10,500rpm	7,000rpm	6,750rpm	10750rpm
Rev Limit	10,000rpm	6,750rpm	6,500rpm	10500rpm

[1] Some 2.7's 3 bar

[2] Runs all the time

[3] 3 bar for engines mapped on 4 bar

[4] Jenvey DBW only

AIM DATA SOFTWARE

To download data from your AIM data logger you must first have the Race Studio 2 Software package installed on your laptop. This package should include Race Studio 2, Race Studio Analysis and SmartyManager.

RACE STUDIO 2

The Race studio 2 is used primarily to download the data from the data logger and save it on your PC for later analysis in Race Studio Analysis. Race Studio is also used to configure and calibrate your data logger. Configuration shouldn't need to be carried out once the system is initially set up unless additional sensors are added (eg, brake pressure sensors, suspension potentiometers). Calibration should be carried out before each race weekend or trackday meeting.

NOTE: If you are getting a message "Impossible to connect to Data Logger" this is probably due to not having the USB Drivers installed for Aim properly. If this occurs please refer to the AIM Manual.

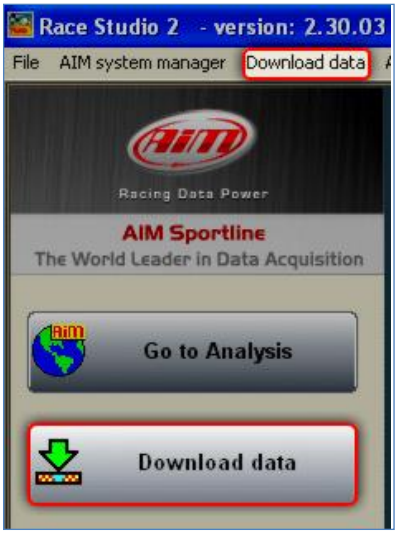
RACE STUDIO ANALYSIS

The Race Studio Analysis software is where you can view all of the "runs" that you have downloaded from your AIM data logger.

Smart Manager (only applicable if AIM SmartyCam is installed)

Smart Manager is used to configure the SmartyCam to display various outputs from the data. For example the throttle position, brake position, RPM, Speed, Lap times etc. You also carry out firmware updates for the SmartyCam through SmartyManager.

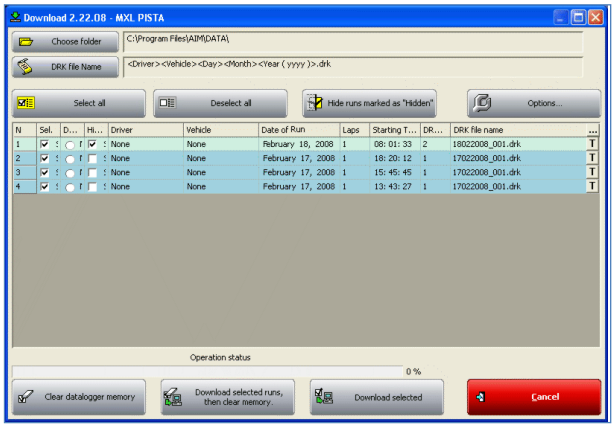
DOWNLOADING DATA FROM THE AIM DATA LOGGER (MXL PISTA DASH)



As stated above you must have Race Studio 2 installed on your PC. The following steps will talk you through how to get the data downloaded onto your PC.

1. Connect your laptop to the car via a data download cable and power on the device (turn on the master switch)
2. Open Race Studio 2 and click on the "Download Data" icon on the left hand side. This will open the pop-up download window.

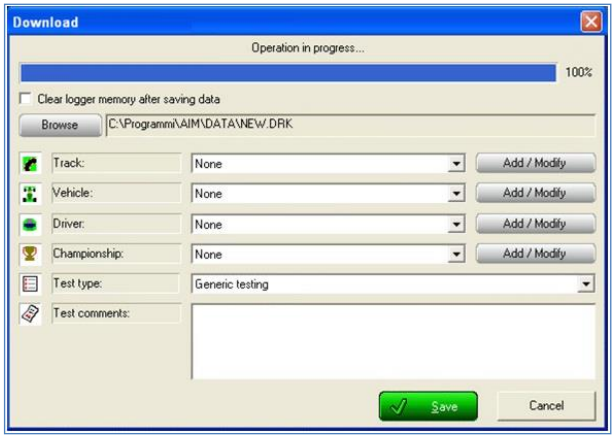
3. This pop-up download window displays all of the runs currently stored on the logger with the date and time of each run.



4. Previously downloaded runs will not be selected automatically so you should be able to click on "Download selected" or "Download selected runs, then clear memory". It is recommended that you "Download selected" and leave a backup on the logger until you have backed up the data from your PC to another storage device (e.g., a USB key).

5. The progress bar at the bottom indicates that the data is being downloaded.

6. When the download progress bar reaches 100% another window opens with the option to input some details about the session to make it easier to identify which session to look at later on in Race Studio Analysis. This is an important step so identify as many variables as possible (eg, vehicle, driver, track, test type and add a comment). The name for the file is automatically generated.



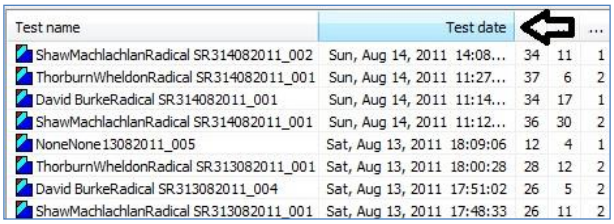
7. Click the OK or Save button and the progress bar indicates when the saving is complete.

8. The data is now downloaded and saved on your PC for analysis in Race Studio Analysis.

VIEWING PREVIOUSLY DOWNLOADED AIM DATA IN RACE STUDIO ANALYSIS

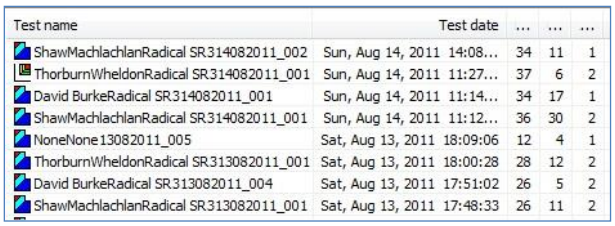
Having downloaded the data from your device using Race Studio 2 you can now view it and analyse it in Race Studio Analysis.

1. Open Race Studio Analysis.
2. The data that you have downloaded is automatically put into the "**Test Database**". The test database can be arranged by any of the variables, but the most useful one is to arrange by date so that the latest downloaded data is at the top. Click on the **Test Date** shown here



Test name	Test date	...	...	...
ShawMachlachlanRadical SR314082011_002	Sun, Aug 14, 2011 14:08...	34	11	1
ThorburnWheldonRadical SR314082011_001	Sun, Aug 14, 2011 11:27...	37	6	2
David BurkeRadical SR314082011_001	Sun, Aug 14, 2011 11:14...	34	17	1
ShawMachlachlanRadical SR314082011_001	Sun, Aug 14, 2011 11:12...	36	30	2
NoneNone13082011_005	Sat, Aug 13, 2011 18:09:06	12	4	1
ThorburnWheldonRadical SR313082011_001	Sat, Aug 13, 2011 18:00:28	28	12	2
David BurkeRadical SR313082011_004	Sat, Aug 13, 2011 17:51:02	26	5	2
ShawMachlachlanRadical SR313082011_001	Sat, Aug 13, 2011 17:48:33	26	11	2

3. To open a particular test simply double click on the test you wish to open.

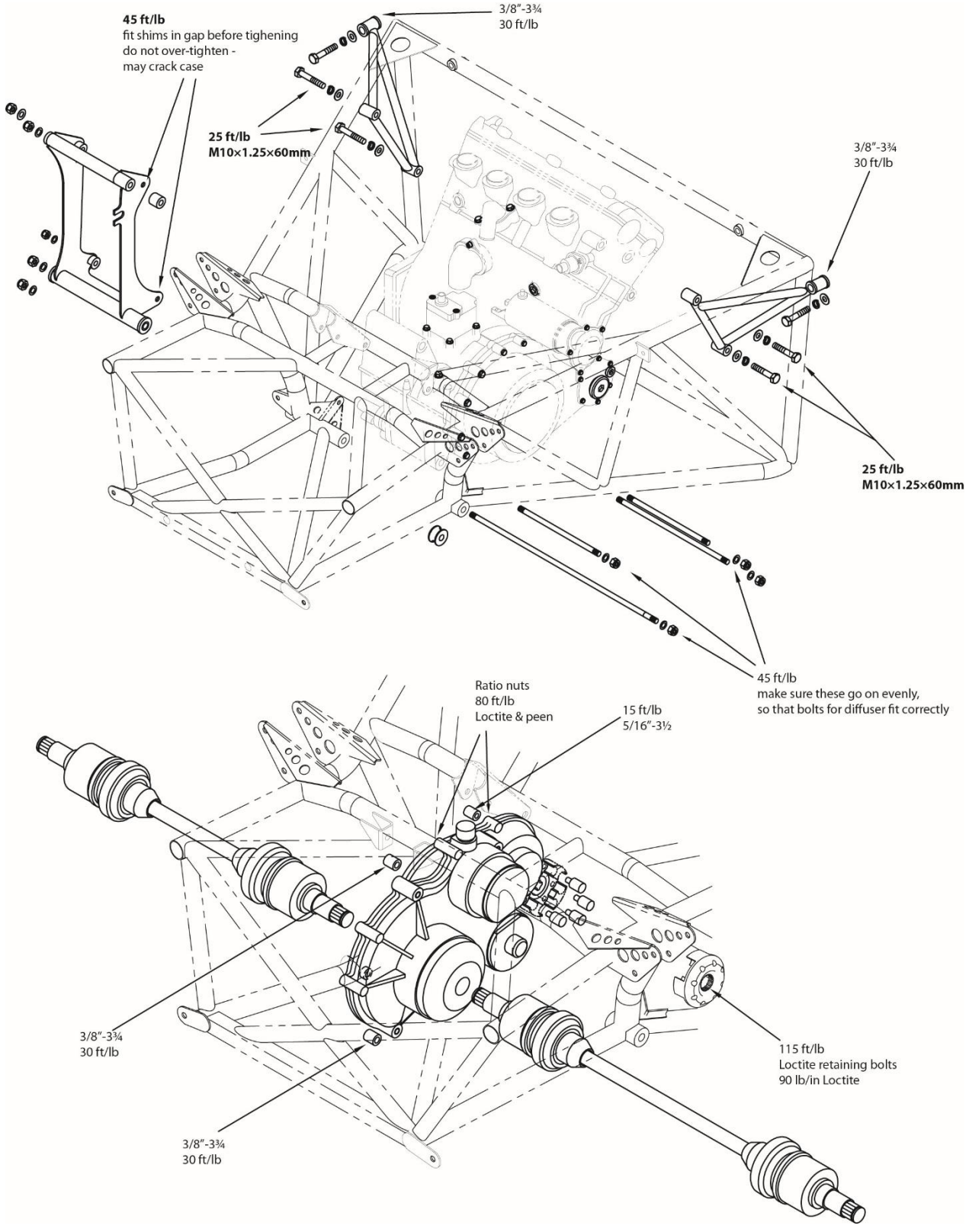


Test name	Test date	...	...	...
ShawMachlachlanRadical SR314082011_002	Sun, Aug 14, 2011 14:08...	34	11	1
ThorburnWheldonRadical SR314082011_001	Sun, Aug 14, 2011 11:27...	37	6	2
David BurkeRadical SR314082011_001	Sun, Aug 14, 2011 11:14...	34	17	1
ShawMachlachlanRadical SR314082011_001	Sun, Aug 14, 2011 11:12...	36	30	2
NoneNone13082011_005	Sat, Aug 13, 2011 18:09:06	12	4	1
ThorburnWheldonRadical SR313082011_001	Sat, Aug 13, 2011 18:00:28	28	12	2
David BurkeRadical SR313082011_004	Sat, Aug 13, 2011 17:51:02	26	5	2
ShawMachlachlanRadical SR313082011_001	Sat, Aug 13, 2011 17:48:33	26	11	2

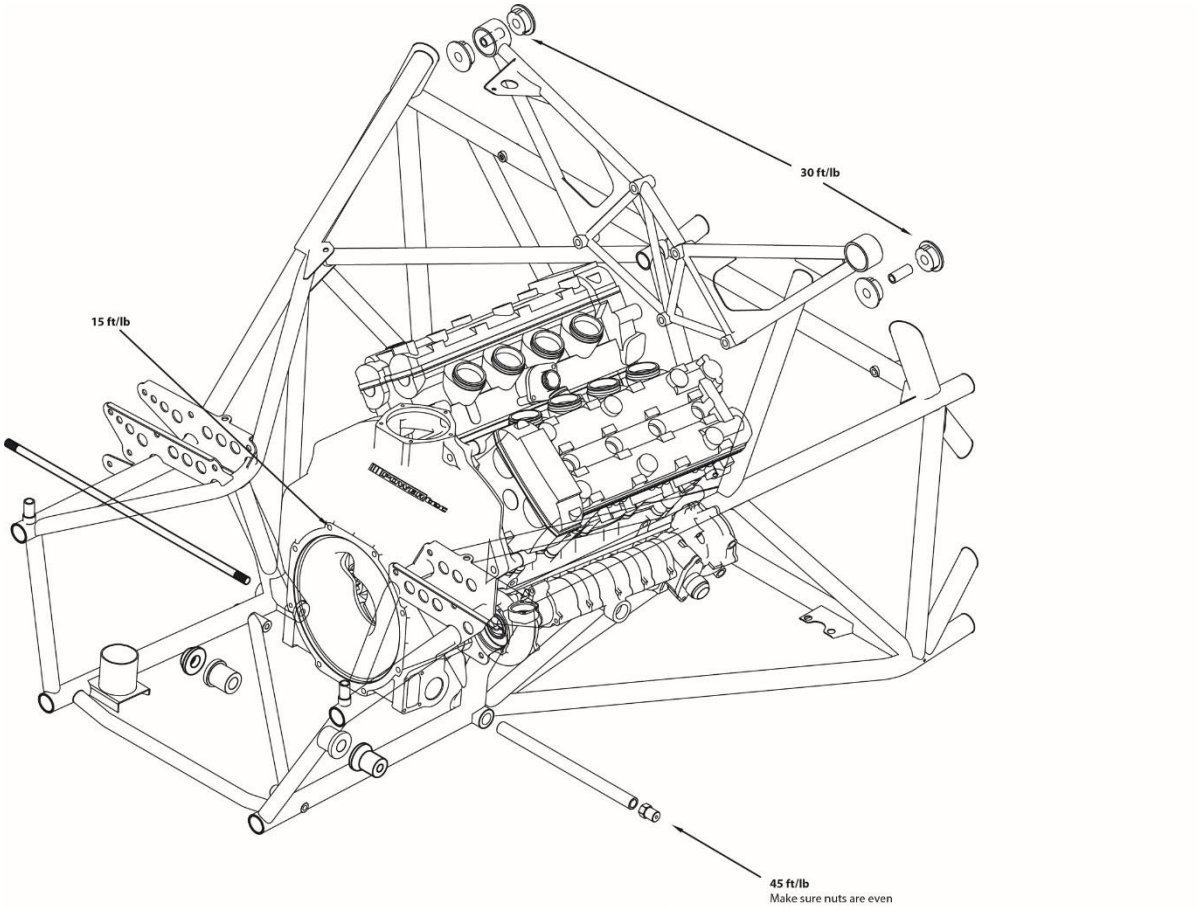
4. The blue icon on the left turns yellow on tests that are open.
5. This opens up the test and shows various options along the bottom of the screen that can be selected by clicking on them. As shown below:-

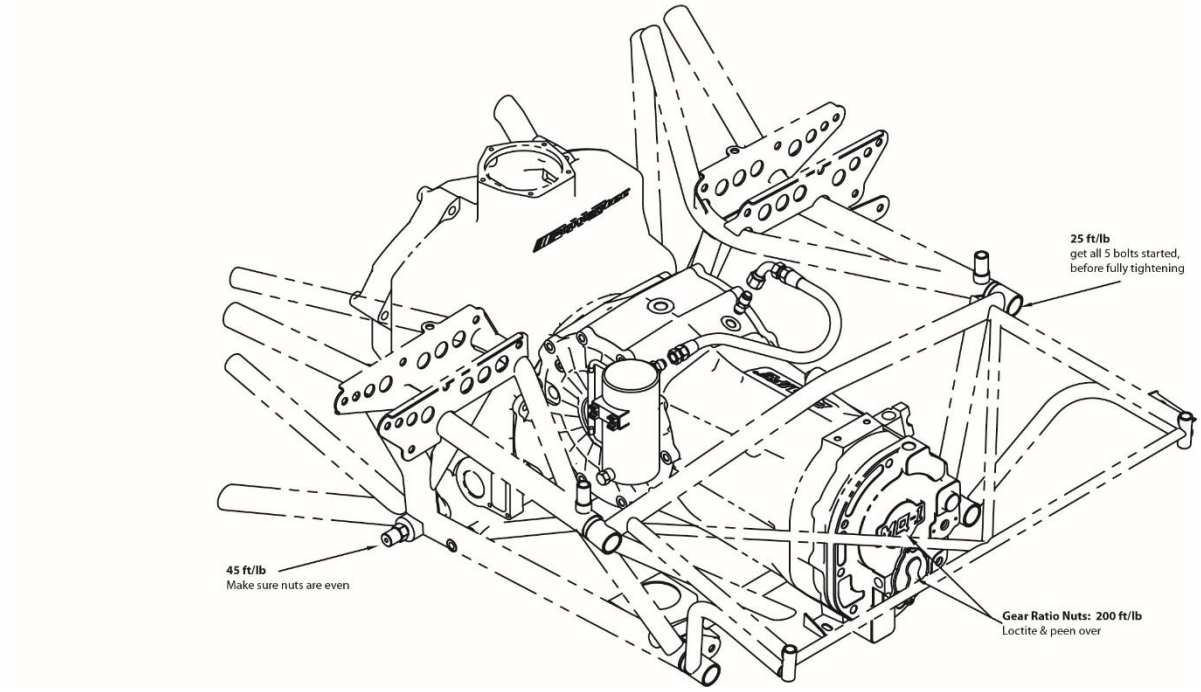
6. The **Test Database** tab takes you back to the Test Database and enables you to open more tests or close open tests
7. The **Lap Manager** tab will show laps times including in and out laps.
8. The **Measures Graph** tab is used to compare variables such as Speed, Throttle Position, Brakes Pressures etc between 2 or more laps
9. The **Channels Report** tab is used to look at Maximum and Minimum values for certain variables. This is a useful tool for assessing the engines temperatures and pressure.

SR3 ENGINE & GEAR DRIVE UNIT

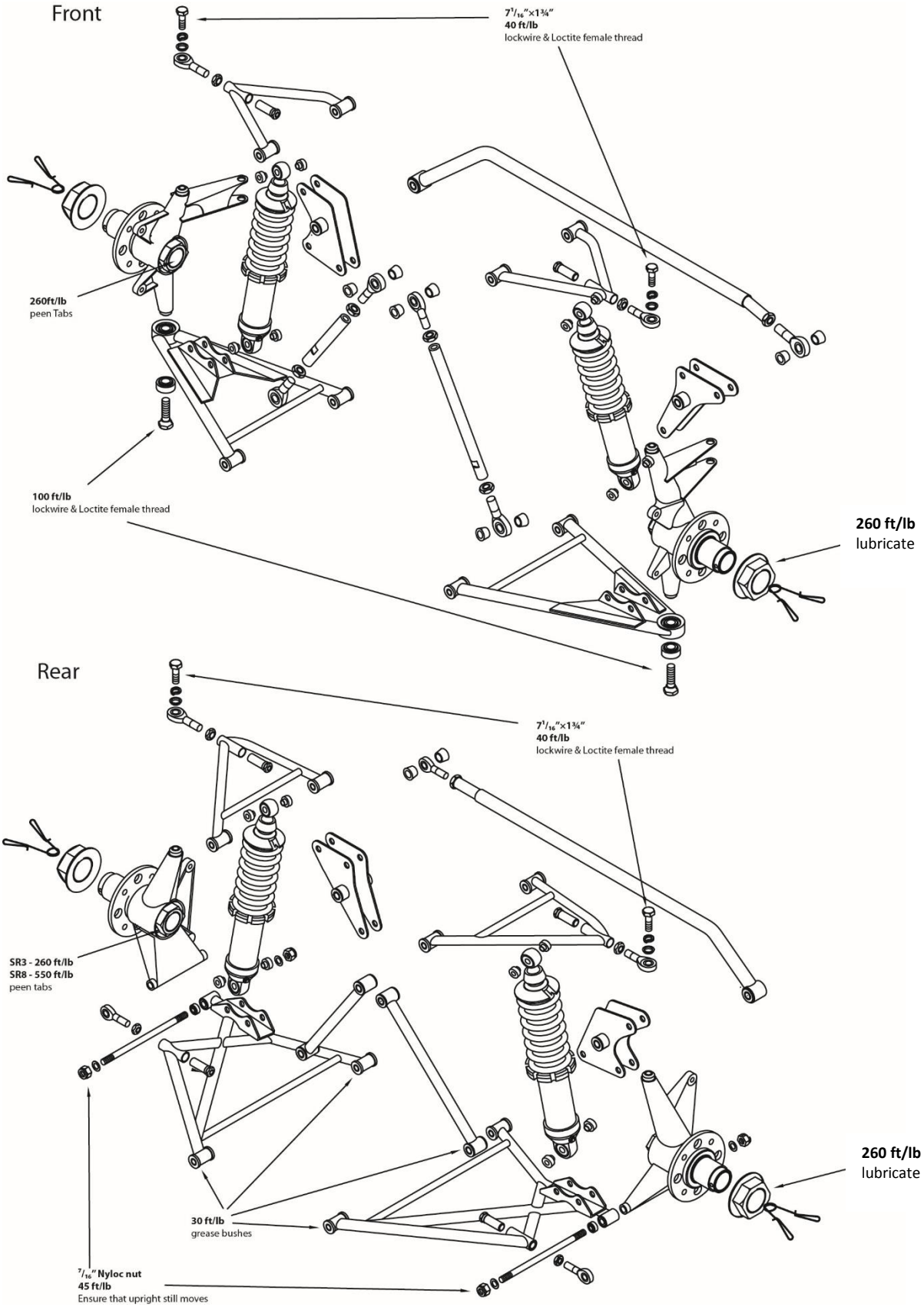


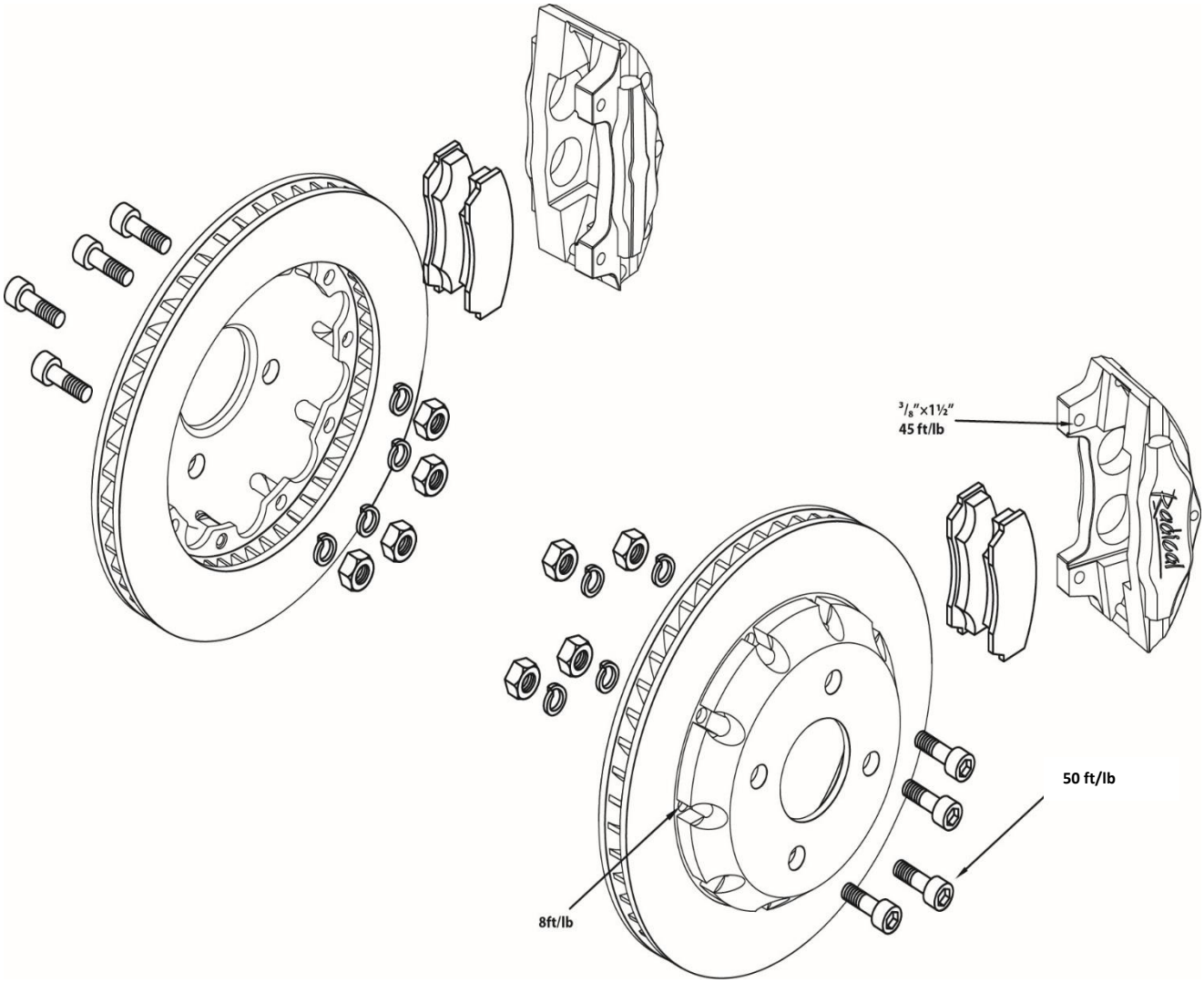
SR8 ENGINE & GEARBOX





SUSPENSION COMPONENTS




3/8"×1½"
45 ft/lb
50 ft/lb
8ft/lb
Radical

RXC TORQUE SETTINGS

Brakes Bolts (Bell to Rotor)	8Nm	6lbft	M6
Drive Pegs	60Nm	44lbft	7/16
Brake Bleed Nipple		10Nm	7lbft
Wishbones to Chassis	40Nm	30lbft	3/8
Wishbone (F+R) to Upright Clevis	65Nm	48lbft	M10
Upright to Bottom Wishbone (K Nut)	80Nm	59lbft	M12 K nut (Non Lubricated)
Steering Bracket to Upright (K Nut)	25Nm	18lbft	M8 K nut
Steering Bracket to Steering Arm	40Nm	30lbft	3/8
Rear Toe Link to Upright (K Nut)	25Nm	18lbft	M8 K nut
Rear Toe Link to Wishbone	40Nm	30bft	3/8
Lower Upright Stud	260Nm	192lbft	M16
Caliper to Upright	65Nm	48lbft	M10
Upright Bearing Hub Nuts	745Nm	550lbft	
Wheel Nuts	352Nm	260lbft	
Rocker to Chassis or Casting	48Nm	35lbft	M10
Damper to Chassis/Rocker	35Nm	26lbft	M8
Pushrod to Wishbone/Rocker	40Nm	30lbft	3/8
ARB Pushrod to Rocker/ARB	25Nm	18lbft	M8
Rear ARB Mount to Casting	25Nm	18lbft	M8
Rear Wishbone Brackets to Casting	16Nm	12lbft	M6
Casting Top to Chassis (Bolts)	88Nm	65lbft	M12
Casting Lower to Chassis (pin)	88Nm	65lbft	M12
Casting to Rear Frame	65Nm	48lbft	M10
Front ARB Mount Bracket to Steering Rack	25Nm	18lbft	M8
Steering Rack to Chassis	25Nm	18lbft	M8

RADICAL SR3:

OIL TYPE	PART NUMBER	AMOUNT (L)	BRAND	VISCOSITY/ TYPE	LITRES REQ
ENGINE OIL	EO0007	5	FUCHS TITAN PRO R	15W - 50	7
BRAKE FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.8
CLUTCH FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.2
GDU OIL	TO0002	1	FUCHS RACE SYN 5	75W - 90	1.5
COOLANT	HW0001	1	TRIPLE QX (50:50 mix)	ALU ENGNIES -36°C FREEZING	7

RADICAL SR8:

OIL TYPE	PART NUMBER	AMOUNT (L)	BRAND	VISCOSITY/ TYPE	LITRES REQ
ENGINE OIL	EO0007	5	FUCHS TITAN PRO R	15W - 50	9
BRAKE FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.8
CLUTCH FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.2
GEARBOX OIL	TO0002	1	NEO SYNTHETICS	75W - 90	3.7
COOLANT	HW0001	1	TRIPLE QX (50:50 mix)	ALU ENGNIES -36°C FREEZING	10.5

RADICAL RXC V6:

OIL TYPE	PART NUMBER	AMOUNT (L)	BRAND	VISCOSITY/ TYPE	LITRES REQ
ENGINE OIL	EO0038	5	FUCHS TITAN SUPER SYN	5W - 30	10
BRAKE FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.8
CLUTCH FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.2
GEARBOX OIL	TO0010	3.7	NEO SYNTHETICS	75W - 90	3.7
COOLANT	HW001	1	TRIPLE QX (50:50 mix)	ALU ENGNIES -36°C FREEZING	13

RADICAL RXC V6 TURBO:

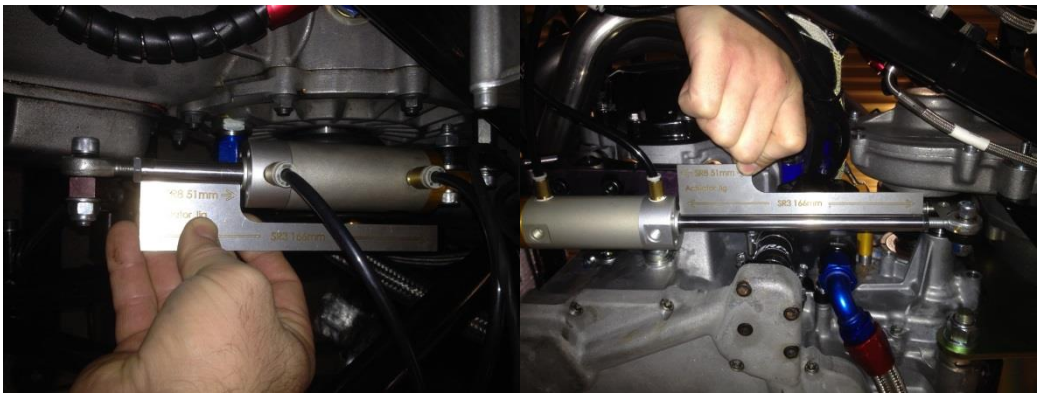
OIL TYPE	PART NUMBER	AMOUNT (L)	BRAND	VISCOSITY/ TYPE	LITRES REQ
ENGINE OIL	EO0038	5	FUCHS TITAN SUPER SYN	5W - 30	10
BRAKE FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.8
CLUTCH FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.2
GEARBOX OIL	TO0010	3.7	NEO SYNTHETICS	75W - 90	3.7
COOLANT	HW001	1	TRIPLE QX (50:50 mix)	ALU ENGNIES -36°C FREEZING	13
CC COOLANT	HW001	1	TRIPLE QX (50:50 mix)	ALU ENGNIES -36°C FREEZING	10.5

RADICAL RXC V8:

OIL TYPE	PART NUMBER	AMOUNT (L)	BRAND	VISCOSITY/ TYPE	LITRES REQ
ENGINE OIL	EO0007	5	FUCHS TITAN PRO R	15W - 50	7
BRAKE FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.8
CLUTCH FLUID	BF0004	0.5	AP RACING	DOT4 - 600 RACING	0.2
GEARBOX OIL	TO0010	3.7	NEO SYNTHETICS	75W - 90	3.7
COOLANT	HW001	1	TRIPLE QX (50:50 mix)	ALU ENGNIES -36°C FREEZING	11

GEAR ACTUATOR SETUP - SR8 AND RXC

Radical Sportscars Parts department (contact details available at the end of the Mechanics Handbook) can provide a jig for setting the Actuator length on both the SR3 and the SR8. This is simply done as shown in the pictures below:

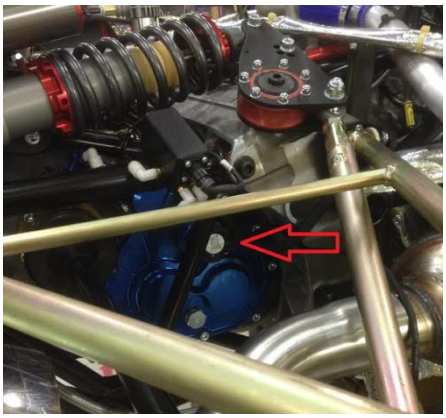


Note: The RXC does not need the Actuator setting.

GEAR POSITION SENSOR SETUP

To set up the Gear Position Sensor on an RXC or RXC Spyder there is not a jig. It must be set manually using the Life Software program called "PTMon". The sensor is located on the right hand side of the Quaife 7 Speed Gearbox See picture below. To set the Gear Sensor, follow the steps below:

- Connect a laptop (using the Life Download Lead) and turn the master switch on.
- Make sure the car is in Neutral
- Open PTMon and view the sensor named GearV.
- Loosen the 2 retaining bolts, adjust the sensor until GearV reads 1.100V ± 0.05
- Secure the sensor by tightening the 2 bolts and check the GearV is still set to 1.100V ± 0.05



To set up the Gear Position Sensor on an SR8 you must use the same Actuator Jig shown above in the "Gear Actuator Setup" section. This Jig is made from 2mm thick material to ensure the correct positioning of the Gear Sensor on an SR8 RX. The sensor is mounted on the back plate of the Quiafe 6 Speed Gearbox. The process is explained below:

- Remove the heatshield
- Loosen off the 2 securing bolts (do not remove)
- Place the actuator jig between the top of the sensor and the part of the gearbox case above it (See picture below) and tighten the bolts to secure in position
- Check the Gear sensor voltage using the Life Software program called "PTMon". On an SR8, in Neutral the gear voltage should be 1.051 ± 0.05.

Note: If not using the Actuator Jig then use PTMon to set the Neutral gear voltage as 1.051V ± 0.05 as shown in the "RXC Gear Position Sensor Setup" section.

Note: The SR3 Gear Sensor is inside the gearbox and is set by RPE when the engine is built.

WHEEL SPEED SENSOR INSTALLATION AND SETUP – ALL MODELS

Radical Sportscars Parts department (contact details available at the end of the Mechanics Handbook) can provide a jig for setting the wheel speed sensor. Using a pair of 13mm spanners, set the wheel speed sensor no closer to the pickup point than the thickness of the Wheel Sensor Gauge. The pickup point is the end of the brake disc bolts on an SR3/SR8. This is shown in the picture below. For an RXC the pickup point is the back of the drive pegs.

Part 1: Setting up the Throttle Body Sensors. TPS1A and TPS1B

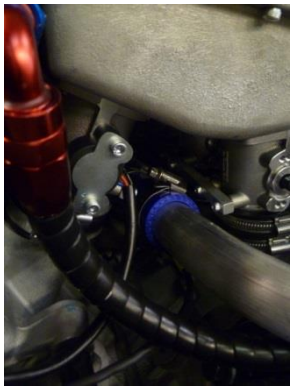
With the cars master switch off, remove the power to the drive-by-wire actuator (motor) by disconnecting the two-pin SuperSeal connector.

- Connect a laptop (using the Life Download Lead) and turn the master switch on.
- Open Life Mon and select the sensors that you wish to view. These sensors areTPS1A and TPS1B. These are found under the section titled "Sensors" and sub-section "Throttle Position"
- Check that the butterflies are completely shut (visually), apply some force on the mechanism if required.

- Adjust sensor so that TPS1A (sensor on the Actuator) reads 2% (+/- 0.1%)

TPS1A – sensor on actuator

- Adjust sensor so that TPS1B (Sensor on Throttle Bodies) reads 2% (+/- 0.1%)



TPS1B – sensor on bodies

- Switch the Master Switch off and reconnect the power to the motor (the 2 pin SuperSeal connector that was unplugged at the start of this procedure).

Note: if the correct position cannot be achieved on the sensor (i.e. the sensor runs out of adjustment) then the sensor is faulty and must be replaced.

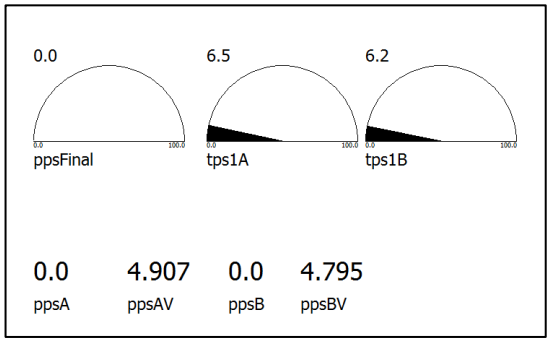
Note: with the power to the actuator re-connected tps1A and tps1B will no longer read 2%. This is normal, and is due to the cold start procedure. When the car is warm, tps will return to around 4%.

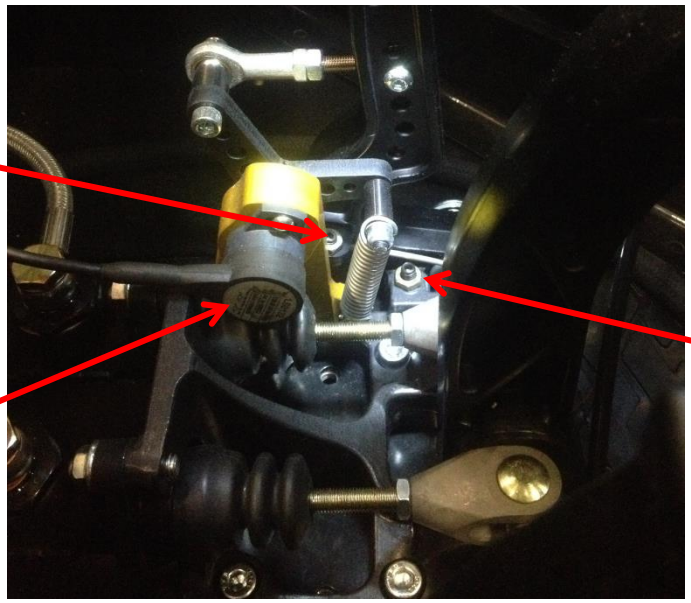
Part 2: Setting up the Pedal Position Sensor. ppsA and ppsB

The second part to setting up the drive-by-wire throttle bodies is to set up the Pedal Position Sensor. The pedal position sensor has 2 sensors built in to one. This is a safety mechanism, if the 2 measures ever go out of alignment, the PPS defaults to zero as a safety precaution.

The pedal position sensor is located on the throttle pedal. Again, the Life Software program "LifeMon" is used to monitor the two pedal position sensors during calibration. These are found in the same way as described in Part 1.

This picture shows all of the sensors that you need to monitor in LifeMon when setting up the Drive-by-Wire throttle bodies.





Follow the steps below to set up the Pedal Position Sensor. During this set up procedure ppsA and ppsB should match. If they ever do not match then the sensor is faulty and must be replaced:

- Remove the Pedal Position Return Stop.
- Loosen the two bolts holding the Pedal Position Sensor on the throttle pedal
- Turn the Pedal position sensor to set ppsA/ppsB to 0.0
- Tighten the bolts to hold the sensor in place and ensure ppsA/ppsB are still 0.0
- Adjust the throttle stop so that the max value for ppsA/ppsB at full throttle is 102.0
- Tighten the throttle stop.
- Finally check that ppsA and ppsB match throughout the range of travel

POWER STEERING SETUP AND CALIBRATION – RXC AND RXC SPYDER

There are 3 main components to the Radical EPAS (Electronic Power Assisted Steering) system that may need changing due to accident damage or part failure. These are as follows:

1. Power Steering Motor (located on the steering column)
2. EPAS ECU (located near the steering column)
3. Steering Angle Sensor (located on the steering rack)

Pt1: Replacing the Power Steering Motor and/or the EPAS ECU

There are some notes to be aware of when replacing these items to re-calibrate the system to ensure correct functioning of the EPAS system.

If the Power Steering Motor and/or the EPAS ECU need to be replaced then the system needs to be re-calibrated in the central position. To do this, follow these instructions:

- Lift the front of the car off the ground
- Put the steering wheel in the straight ahead position
- Cycle the master switch 7 times.

The EPAS warning LED should now flash rapidly a number of times. This shows that the system has successfully re calibrated.

Pt2: Replacing the Steering Angle Sensor

This steering angle sensor has two plugs on it. The signals go to both the EPAS ECU and the Aim Datalogger dash.

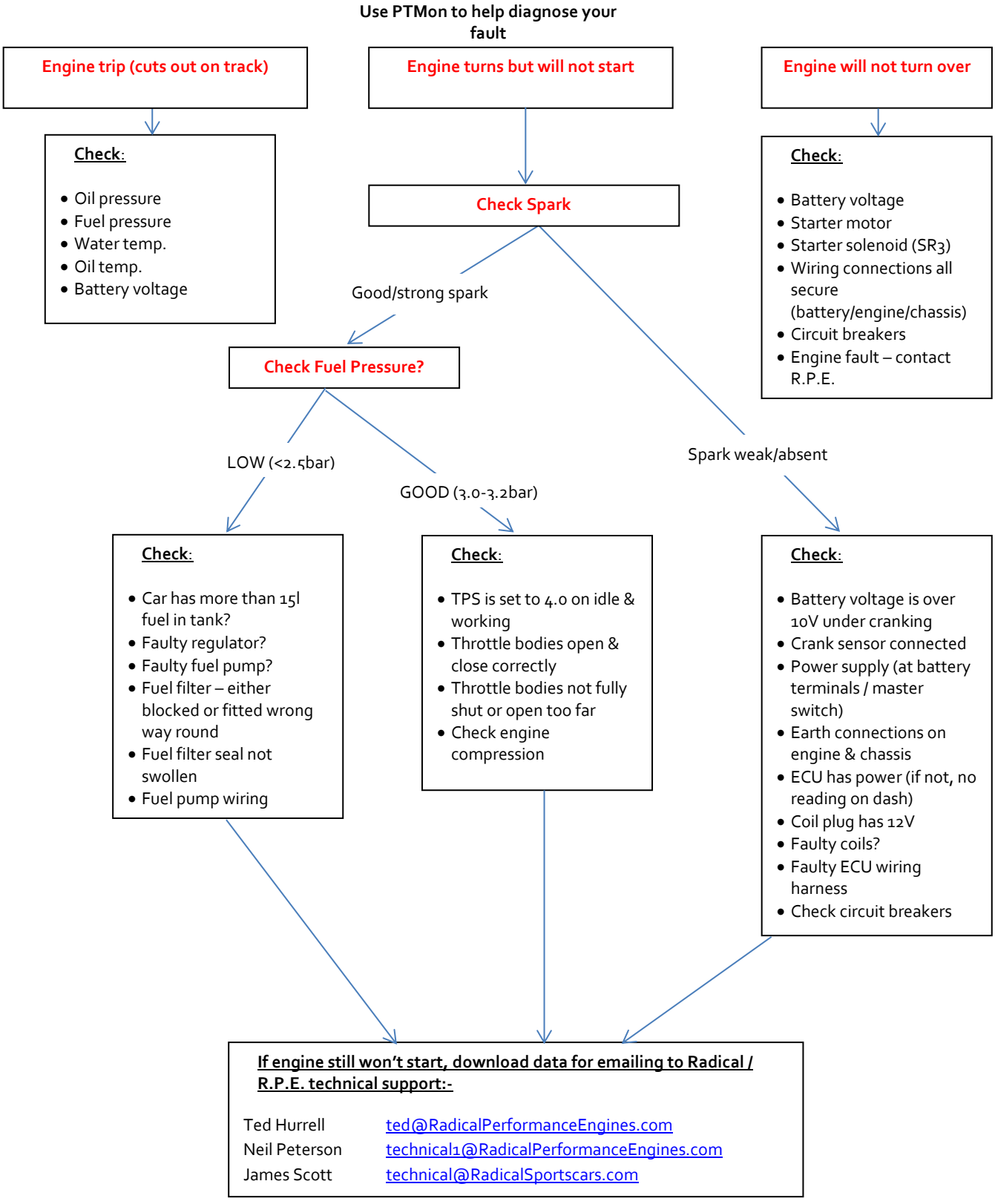
When replacing the steering angle sensor, it is important to set the sensor in the middle of its 5v range with the wheels straight ahead before fitting it to the steering rack. This is done by following these steps:

- Plug the sensor in to both of the plugs
- Connect a laptop to the car using the Aim download lead
- Open Race Studio
- View the live values for the sensors and monitor the "Steering angle Channel"
- Show mV values
- Set the sensor to 2500mV

The sensor is now ready to install in the rack. See picture for reference. Note, the wire coming out of the sensor points down.

Note: After the sensor is installed in the rack, follow the instructions above in Pt1 to Re-Calibrate the system.

TROUBLE-SHOOTING GUIDE – STARTING - SR3 & SR8



TROUBLE-SHOOTING GUIDE – ENGINE MIS-FIRE

Use PTMon to help diagnose your fault

If not one specific cylinder, or mis-fires is just at high revs

Which Cylinder is mis-firing?

Check:

- Master Switch connection, ignition switch a& battery connections
- Fuel is not contaminated
- TPS is working & set at 4.0 at idle
- Water Temp sensor has not failed
- Main battery has 12V under load (SR3 with 24V starting only)

Check Spark

Good/strong spark

Check:

- Fuel Pressure is good
- Injectors plugged in properly & functioning
- TPS is working & set at 4.0 at idle
- Throttle bodies not fully shut or open too far
- Cylinder compressions
- Spark plug gaps are correct

Spark weak/absent

Try:

- Replacing spark plug
- Replacing HT lead

(If the coil is faulty, two cylinders will have no spark i.e. 1&4, or 3&4)

Check:

- Main battery has 12V under load (SR3 with 24V starting only)
- Coil wiring is not faulty
- Download data and check BTMax parameter (ECU temperature reading) to check for spike in temps recorded

If engine still won't start, download data for emailing to Radical / R.P.E. technical support:-

Ted Hurrell ted@RadicalPerformanceEngines.com
Neil Peterson technical1@RadicalPerformanceEngines.com
James Scott technical@RadicalSportscars.com

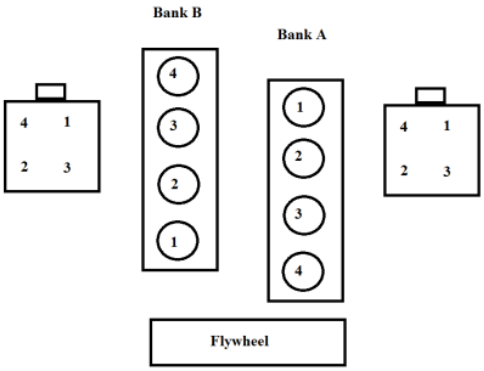
TROUBLESHOOTING UNEQUAL BANK TO BANK RUNNING ON V8 ENGINES

1. Are the throttle bodies out of balance?

   Check and rebalance using a syncrometer. If a syncrometer is not available then manually pick the revs up and listen for a change in engine note as both banks begin firing. At this point both sets of exhaust primaries should warm up together.

2. Are the plug leads and coils connected in the correct orientation?

   Please see the diagram of the plug lead and cylinder layout. The engine runs wasted spark ignition so leads 1&4 can be installed in either orientation as can leads 2&3.



3. If the spark plugs have recently been changed, are the caps missing from the plugs?

4. Download the ECU data and email in to the factory. If the car is fitted with a Life ECU the data can be downloaded and analysed. Software and instructions on how to do this can be found in the download section of www.radicalperformanceengines.com.

   The "syncState" channel will show if the ECU is receiving a signal from the cam sensor. The channel will display 720° when the engine is running with a working cam sensor. It will display 360° if the engine is started and the ECU cannot detect the cam sensor.

5. Carry out a compression and leak down test on all 8 cylinders and send the results to the factory. Ensure that the throttle is held wide open and the ignition is switched off. 10-12 engine rotations should be enough to produce sufficient readings.

6. Check both banks exhaust systems for blockages or restrictions, especially if it is a non-Radical system.

7. Check the inlet cams in both banks are turning by removing the cam sensor from both banks of the engine. With the ignition switched off crank the engine over and look to see if the cams are turning.

PADDLE SHIFT TROUBLE SHOOTING GUIDE

As of 2010, all radical cars that have the paddle shift option fitted new from the factory, will be fitted with a closed loop paddle shift system that is controlled by the engine ECU.

This system relies on a magnetic gear position sensor fitted internal on SR3 Hayabusa engine, and on the end of the gearbox, nearest the rear of the car, on the SR8, and SR3 SL

Most gear change problems can be diagnosed by downloading the engine management data, and viewing the items listed below -

paddleswitch This parameter shows when the switch has been operated by the driver, and which paddle the driver pulled.

gear This shows what gear the gearbox is in

gearv This shows the signal that the sensor is sending back to the ECU. It is in direct relationship to the movement of the selector barrel. This can be used to check for interference to the sensor

It can also be used to determine gear change actuator operation. If the **paddleswitch** has been operated but this channel shows no signs of change, then the gear change actuator isn't moving or there is a fault with the mechanic side of the gearbox i.e. selector mechanism is jammed.

tps This shows throttle position. This can be viewed to determine whether the throttle is being blipped on the downshift.

If there is no jump in the **tps** trace when the downshift paddle is being pulled, then 95% of the time, it won't downshift.

gearshiftdecision This is a vital parameter to view when diagnosing paddle shift problems, as this shows you if the ECU has disallowed a gearshift.

There a number of settings in the ECU that are used to control the operation of the shift system.

An example is **TPS**. If the throttle is over 20% when the downshift paddle is pulled, then it won't change down. This is to prevent over-revving the engine.

gsp This shows the pressure of the paddle shift system. If this is too low, the system won't operate. (This will show up in the **gearshiftdecision** data).

It can also be used to determine a fault with one of the actuators. For example, if the **gsp** value drops when the paddle shift is operated, it indicates that the distribution valve block is operating. If the **gsp** doesn't drop, then the valve block is not operating. (

gsp control This shows when the ECU has asked for the compressor to be turned on. If this is showing "on", but the compressor is not operating, then there is a problem with either the compressor relay, the connections, or the compressor itself is not operating.

rpm Is the rpm is over 9200, the gear will disallow a downshift. This is to prevent damage to the engine.

vehicle speed/ flspeed/ fr/speed

These three channels are used to determine vehicle speed. On some models, the system is programmed to disallow downshifts into neutral while the car is moving. This is to prevent accidental mis-shifts into reverse

vbat this channel is viewed to check the electrical supply to the system. (complete car electrical system). If the charging system is not working, the paddle shift system (and many other systems on the car) won't operate correctly.

Below are listed some other common problems that will affect the shift operation

PADDLE SHIFT TROUBLE SHOOTING GUIDE - UPSHIFT

wiring to steering wheel paddles

This can be caused if the driver removes the steering wheel aggressively without disconnecting the dash plug

Gear change actuator adjustment (as described above)

System leaks

Gear change valve block faulty

Paddle switch wiring on steering wheel damaged

system changes gear without paddle operation this can be caused by damage to the steering wheel paddle wiring.

Both upshift and downshift will affected by bad electrical connections, poor battery voltage, air leaks in the system, and interference or damage to the gear position sensor.

Any problems that are related to a specific gear i.e. works 3rd to 4th, but not any others, would usually indicate a mechanical fault within the gearbox.

Above all, any gear change issues should be addressed immediately, as failure to do so will cause gearbox and potentially engine damage and invalidate the engine warranty.

IF YOU REQUIRE ASSISTANCE WITH ANY GEAR-SHIFT RELATED PROBLEMS, YOU CAN EMAIL THE DOWNLOADED ENGINE DATA TO:

technical@RadicalSportscars.com and / or technical1@RadicalPerformanceEngines.com

wiring to steering wheel paddles

This can be caused if the driver removes the steering wheel aggressively without disconnecting the dash plug

throttle cable is slack

This must be kept adjusted as the blipper actuator pulls on the cable to achieve the throttle blip

gear shift actuator operation

The gear change actuator must be able to rotate freely on the bearings at both ends, but must have NO movement in the horizontal direction. i.e play in the bearings

gear change actuator adjustment

This must be set so that the actuator shaft has the same amount of travel in both directions.

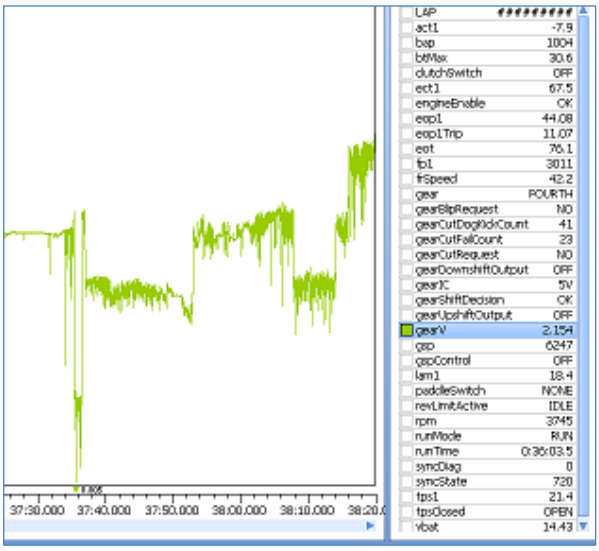
This can be set using a jig that can be obtained from Radical, or by using a steel ruler to measure the amount of travel. Adjustment is made using the rod end on the end of the shaft.

valve block faulty

This unit controls both the downshift part of the gear change actuator operation, and also operates the throttle blipper actuator.

interference or damage to gear sensor

At right is an example of inference of the gear position sensor. This can affect both upshift and downshift.



CONTACT DETAILS FOR KEY STAFF AT RADICALSPORTSCARS

Radical United Kingdom - Group Sales & Marketing Manager, SR1 Cup Coordinator

Roger Green
roger.green@radicalsportscars.com
+44 (0)1733 331616 ext. 217

Radical United Kingdom - Sales Executive

Jon White
jon.white@radicalsportscars.com
+44 (0)1733 331616 ext. 215

Radical United Kingdom - Export Sales Manager

Paul Dujon
duj@radicalsportscars.com
+44 (0)1733 331616 ext. 214

Radical United Kingdom - European & UK Championship Coordinator, Sales Administrator

Amanda Abbott
amanda@radicalsportscars.com
+44 (0)1733 331616 ext. 201

Radical United Kingdom - Marketing Executive

Will Brown
willb@radicalsportscars.com
+44 (0)1733 331616 ext. 210

Radical United Kingdom - Technical Support Engineer

James Scott
+44 (0)7876 146854
technical@radicalsportscars.com

Radical United Kingdom - R&D Engineer/Test Driver

James Abbott
james.abbott@radicalsportscars.com
+44 (0)7769 273673

Radical United Kingdom - Parts Manager

Mike Beech
stores@radicalsportscars.com
+44 (0)1733 331616 ext. 262

Radical United Kingdom - Parts Sales & Spares Truck Administrator

Simon Townson
simont@radicalsportscars.com
+44 (0)1733 331616 ext. 212

Radical United Kingdom - RPE Technical Support Engineer

Neil Peterson
technical1@radicalperformanceengines.com
+44 (0) 1733 331919 ext. 241

Radical United Kingdom - RPE Technical Director

Ted Hurrell
ted@radicalperformanceengines.com
+44 (0) 1733 331919 ext. 216

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

PRE RACE / TEST CHECKLIST

Description	PRE Q	PRE R1	PRE R2
Ask Driver if there were any issues	☐	☐	☐
Check with a Senior Engineer if unsure of corrective action	☐	☐	☐
Bodywork			
Remove front & rear bodywork	☐	☐	☐
Inspect bodywork for damage	☐	☐	☐
Inspect front diffuser and rear diffuser	☐	☐	☐
Inspect underneath of side pods	☐	☐	☐
Remove rear diffuser & clean (If required)	☐	☐	☐
Engine			
While oil is still over 70°C, rev engine to 4000rpm for 4seconds, then check engine oil on max, or more depending on track	☐	☐	☐
Check alternator is charging and starter works correctly at the same time	☐	☐	☐
Charge battery (SR8 Only)	☐	☐	☐
Pump out fuel and note quantity	☐	☐	☐
Shake Test			
Check all corners for play in wheel bearings and joints	☐	☐	☐
Lightly shake wing and end plates	☐	☐	☐
Check steering for excessive play	☐	☐	☐
Wheels			
Remove wheels and clean	☐	☐	☐
Check valves are not leaking by using soapy water	☐	☐	☐
Inspect for cuts, flat spots and punctures	☐	☐	☐
Inspect for uneven wear	☐	☐	☐
Clean and lube wheel nuts	☐	☐	☐
Check Engine Data			
Oil surge	☐	☐	☐
TPS	☐	☐	☐
Charging	☐	☐	☐
Paddle shift faults	☐	☐	☐
Sensors	☐	☐	☐
Temps	☐	☐	☐
Low oil pressure (oil temp at 100° with 9000+ Rpm (oil pressure should be between 70-85 Psi)	☐	☐	☐
Suspension & Brakes			
Inspect suspension for cracks and clean	☐	☐	☐
Bleed brakes & check condition of braking system, Also check for excess movement in the bias bar	☐	☐	☐
Spanner Check:			
Upright, wishbones, pushrods, rockers	☐	☐	☐
Engine frame bolts	☐	☐	☐
Oil fittings	☐	☐	☐
Fuel line fittings	☐	☐	☐
Shifting mechanism bolts & bearing in actuator	☐	☐	☐

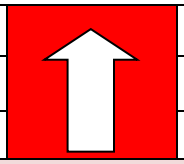
Exhaust bolts	☐	☐	☐
Temp sensor	☐	☐	☐
Wing frame and end plates	☐	☐	☐
Pedals/pads	☐	☐	☐
Mirrors – check with driver if altered	☐	☐	☐
Braking system	☐	☐	☐
Drive unit bolts	☐	☐	☐
Hose clips	☐	☐	☐
Engine Checks:			
Throttle bodies working correctly	☐	☐	☐
Throttle cable not too slack or tight + full throttle OK	☐	☐	☐
HT leads are secure	☐	☐	☐
Engine frame for cracks	☐	☐	☐
Water level	☐	☐	☐
Coat engine bay in water dispersant (i.e. WD40) if car has run in rain	☐	☐	☐
No play in drive coupling and lube (SR3 only)	☐	☐	☐
Alternator belt & bolts (SR8 only)	☐	☐	☐
Check engine frame bushes for play	☐	☐	☐
Drain catch tank if required	☐	☐	☐
Check alternator is charging when cold	☐	☐	☐
Gearbox Or Drive Unit And Paddle Shift Checks			
Check all gears work	☐	☐	☐
No air leaks on paddle shift system	☐	☐	☐
Check actuator	☐	☐	☐
Check clutch clears	☐	☐	☐
Check magnet for debris (SR8)	☐	☐	☐
No leaks	☐	☐	☐
Pre-Scrutineering:			
Fill out tyre form	☐	☐	☐
Transponder fitted and number given to Race Control	☐	☐	☐
Check lights are working (brake and fog)	☐	☐	☐
Make sure you know where drivers' kit and sign on paperwork is	☐	☐	☐
Final Checks:			
Vacuum cockpit, pedal box & side pods	☐	☐	☐
Set tyre pressures and fit valve caps	☐	☐	☐
Refit race wheels to car, torque wheels to 240lb/Ft and fit wheel clips	☐	☐	☐
Check fire extinguisher is armed	☐	☐	☐
Fit bodywork & clean	☐	☐	☐
Apply radiator blanking tape as required	☐	☐	☐.
Fuel to correct level	☐	☐	☐
Warmup engine and gearbox	☐	☐	☐
Make Sure Your Pit Trolley Is Loaded With Everything You Need	☐	☐	☐

OVERNIGHT CHECKLIST

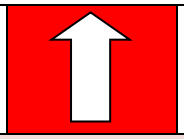
Damper Settings		
	FRONT	**REAR**
Rebound		
High Speed Bump		
Low Speed Bump		

ALL SHOCKS TO BE SET AT FULL SOFT OVERNIGHT

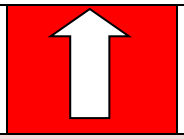
Damper Platform Set Up



Pushrod Length



Trackrod Length



Brake Bias

How many turns from full forward?

Rear Wing Settings

Main Plane - Lowest=1, Highest=4

Flap - Lowest=1, Highest=11

Mark Fuel Cap

WORKSHOP CHECK SHEET

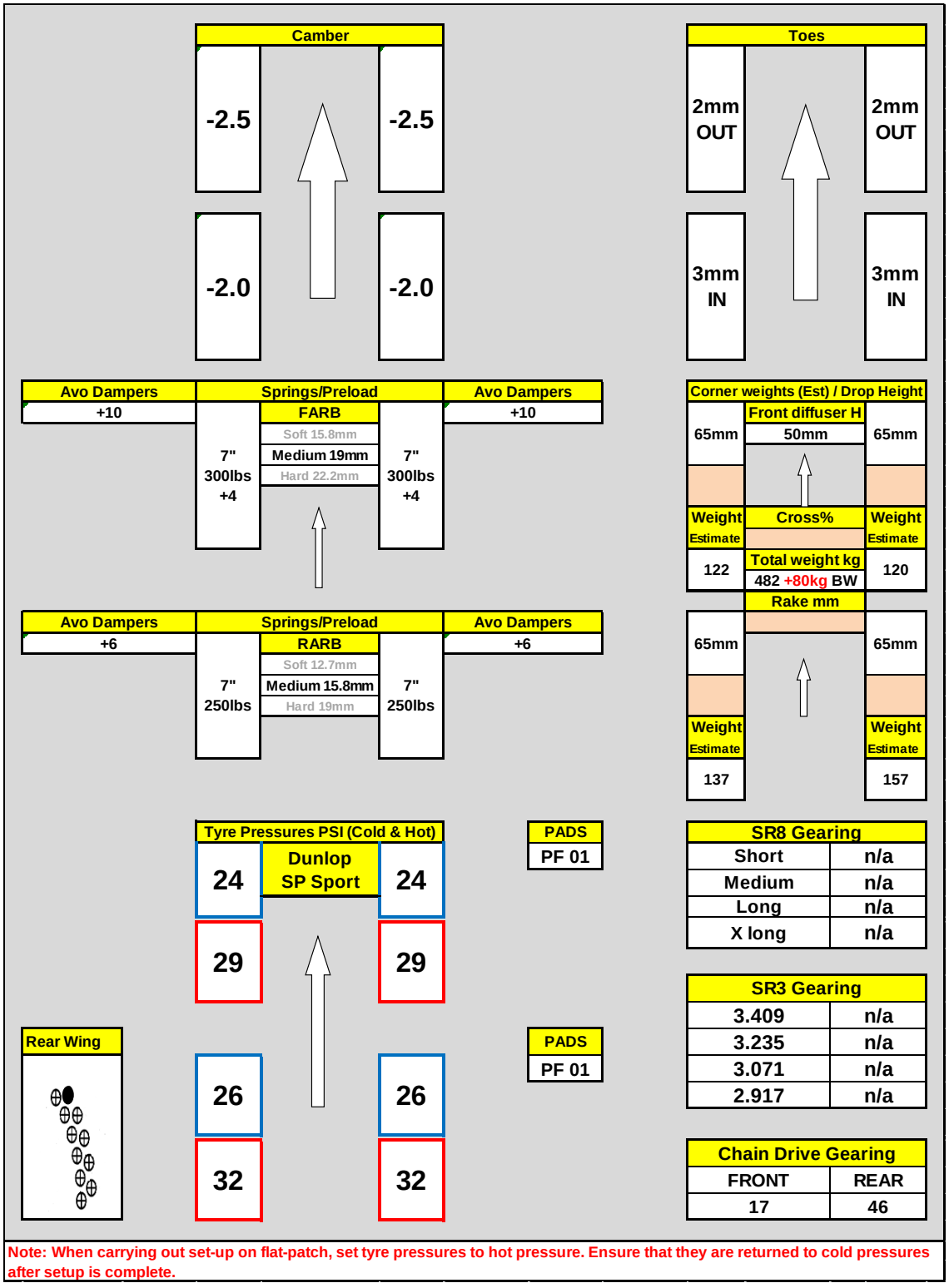
REF.	DESCRIPTION	COMPLETE
1	**CHECK BODYWORK FOR DAMAGE INCLUDING:**	
	LOUVRES	☐
	INFILL PANEL	☐
	UNDERSIDE OF PODS AND SIDE SKIRTS	☐
	THREADS IN BI-WING	☐
	CHECK POWER-STEERING WORKS WITH CAR ON THE FLOOR (IF FITTED)	☐
	REMOVE AND CLEAN REAR DIFFUSER	☐
	PUT CAR ON STAND	☐
	DISARM FIRE EXTINGUISHER	☐
2	**SHAKE TEST**	
	CHECK ALL CORNERS FOR PLAY IN WHEEL BEARINGS AND JOINTS	☐
	CHECK STEERING FOR EXCESSIVE PLAY	☐
	ROCKERS/SPHERICAL BEARING	☐
	FRONT DIFFUSER	☐
2	**REMOVE WHEELS & INSPECT TYRES FOR:**	
	FLAT SPOTS	☐
	CUTS	☐
	PUNCTURES OR LEAKING VALVES	☐
	FIND OUT IF NEW TYRES ARE NEEDED	☐
	CLEAN AND FIT VALVE CAPS	☐
3	**CHECK DATA FOR:**	
	ENGINE HOURS	☐
	OVERREVS	☐
	OVER HEATED	☐
	FUEL PRESSURE	☐
	OIL SURGE	☐
	LOW OIL PRESSURE (Oil temp at 100° with 9000+ RPM	☐
	OIL PRESSURE SHOULD BE BETWEEN 70-85 PSI)	☐
	PADDLE SHIFT FAULTS	☐
	CHARGING	☐
	TPS SET TO 4.0 AND WORKING CORRECTLY	☐
	FAULTY SENSORS	☐
4A	**SR3 - CHECK DRIVEUNIT AND DRIVE TRAIN:**	
	INSPECT AND GREASE DRIVE SHAFTS	☐
	CHECK IF DRIVE UNIT IS READY FOR REFRESH (30-40 HOURS)	☐
	CLUTCH WORKING CORRECTLY	☐
	CHANGE RATIOS OR NOTE WHAT THEY ARE	☐
	CHECK FOWARD GEARS FOR TEETH MISSING AND PITTING	☐
	CHECK FOR CRACKS IN CASINGS	☐
	CHECK BREATHER IS STILL COMPLETE	☐
	CHECK MAGNET FOR DEBRIS	☐
	HAS CORRECT OIL LEVEL	☐
	REVERSE WORKS CORRECTLY	☐

REF.	DESCRIPTION	COMPLETE
4B	**SR8 AND RXC V8- CHECK GEARBOX AND DRIVETRAIN:** CHECK IF GEARBOX IS READY FOR REFRESH (40 HOURS) ☐ INSPECT CROWN WHEEL AND PINION (EVERY 15 HOURS **SR8 QTEC ONLY**) ☐ REMOVE DIFF COVER AND… (**7 SPEED QUAIFE ONLY**) INSPECT BEVEL GEARS ☐ INSPECT OIL PUMP ☐ CHECK GEARS FOR MISSING TEETH AND PITTING ☐ CHECK DOGS FOR WEAR ☐ CHECK SELECTOR FORK PIN AND THAT THE DOG MOVES FREELY IN THE FORK ☐ MAKE SURE THE FORKS MOVE FREELY ON THE SELECTOR SHAFT ☐ VISUALLY CHECK THE PINON PLATE BOLTS ARE TIGHT ☐ CHECK SELECTOR BARREL MOVES FREELY ☐ INSPECT AND GREASE DRIVE SHAFTS ☐ CHECK CLUTCH ADJUSTMENT IS 49MM GAP BETWEEN PEDAL AND STOP ☐	
5	**CHECK CONDITION OF BRAKING SYSTEM:** CHECK PADS ABOVE 5MM ☐ BRAKE BALANCE BAR NOT TOO LOOSE OR TIGHT ☐ FRESH TEMP PAINT IF REQUIRED ☐ CHECK FOR ANY HEAT CRACKS THAT GO TO THE TOP OF DISC ☐ CHANGE CALIPER SEALS EVERY(6 MOUTHS IF NECESSARY) ☐ PRESSURE BLEED BRAKES, CLUTCH IF NECESSARY ☐	
6	**CLEAN CORNERS WHILE CHECKING FOR CRACKS:** DO NOT USE BRAKE CLEANER ON THE SHOCKS UPRIGHT ☐ WISHBONES ☐ NIK LINKS ☐ CHASSIS ☐ WISHBONE PICK UP POINTS ☐ CLEAN AND LUBE WHEEL NUTS ☐ MAKE SURE THE CORRECT PRE LOAD IS WRITTEN ON THE TOP OF THE SHOCK ☐	
7	**SPANNER CHECK:** UPRIGHTS, WISHBONES, PUSHRODS ☐ ROCKERS ,STEERING ,CALIPER ☐ ENGINE FRAME BOLTS ☐ OIL FITTING ☐ FUEL LINE FITTINGS ☐ TEMP SENSOR ☐ PEDALS AND STEERING ☐ DRIVE UNIT BOLTS/GEARBOX BOLTS/DRIVE SHAFT BOLTS ☐ HOSE CLIPS ☐ LOCATING BOLTS ON DISCS ARE NOT WORN OR LOOSE ☐ FRONT DIFFUSER STAYS ☐ AIR JACKS AND NOT LEAKING ☐ BRAKES SYSTEM ☐	

8A	**SR3- CHECK & CLEAN ENGINE BAY:** CRACKS IN ENGINE FRAMES & BUSHES FOR WEAR ☐ CRACKS IN ENGINE CASES ☐ NO PLAY IN DRIVE COUPLING OR CRACKS THEN LUBE ☐ EXHAUSTS ARE TIGHT ☐ DRAIN CATCH TANK ☐ CLEAN OUT AIR FILTER CHECKING NUTS ARE TIGHT IN AIR BOX ☐ THROTTLE CABLE NOT TOO SLACK AND GETS FULL THROTTLE ☐ COOLANT PIPES ARE NOT WEARING THROUGH ON ANYTHING ☐
8B	**SR8 AND RXC V8- CHECK & CLEAN ENGINE BAY:** CRACKS IN FRONT ENGINE & BUSHES FOR WEAR ☐ CHECK ALTERNATER BELT + TENSIONER + BOLTS ☐ CRACKS IN ENGINE CASES ☐ EXHAUSTS ARE TIGHT ☐ DRAIN CATCH TANK ☐ CLEAN OUT AIR FILTER CHECKING NUTS ARE TIGHT IN AIR BOX ☐ THROTTLE CABLE NOT TOO SLACK AND FULL THROTTLE ☐ COOLANT PIPES ARE NOT WEARING THROUGH ON ANYTHING ☐
9	**CHECK WIRING AND PLUGS:** UNDER DASH (IGNITION SWITCH/MASTER SWITCH) ☐ ENGINE BAY ☐ HT LEADS ☐ CONNECTORS ☐ SPEED SENSOR (CORRECT ADJUSTMENT AND TIGHT) ☐
10	**CHECK PADDLE SHIFT:** CHECK FOR LEAKS ☐ GREASE ACTUATOR BEARING ☐ CHECK CORRECT LENGTH OF ACTUATOR ☐ AIR COMPRESSOR FOR EXCESSIVE NOISE & WATER ☐ GO THROUGH ALL THE GEARS ☐ CHECK SPACING ON GEAR POSITION SENSOR (QTEC ONLY) ☐
11A	**SR3 - CHANGE OIL AND FILTER** REMOVE MAIN FEED PIPE ☐ REMOVE 17MM DRAIN BUNG AND CHECK MAGNET FOR DEBRIS THEN RELOCK WIRE BUNG WHEN FINISHED ☐ REMOVE FILTER BY SLACKENING THE HOSE CLIP ☐ FILL ENGINE WITH OIL AND REMOVE SPARK PLUGS FOR DRY CRANKING, CHECKING THE PLUGS ARE OK AT THE SAME TIME ☐
11B	**SR8 AND RXC V8 – CHANGE OIL AND FILTER** REMOVE THE 4 10MM BUNGS ON BOTTOM OF CRANK CASE ☐ REMOVE 17MM DRAIN BUNG ON THE SIDE OF THE SUMP AND CHECK MAGNET FOR DEBRIS THEN RELOCK WIRE THE 4 M6 BOLTS ☐ REMOVE FILTER BY SLACKENING THE HOSE CLIP ☐ FILL ENGINE WITH OIL AND REMOVE SPARK PLUGS FOR DRY CRANKING CHECKING THE PLUGS ARE OK AT THE SAME TIME ☐

12	**RUN ENGINE UP, CHECK OIL LEVEL:** CHECK COOLANT LEVEL ☐ START ENGINE CHECK TPS AND BALANCE BODIES ☐ WARM OIL TO BETWEEN 30°C & 40°C ☐ **SR8 AND RXC V8 ONLY** RUN THE CAR THROUGH THE GEARS WITH IT RUNNING ☐ CHECK THE HEATER BLOWER WORKS ☐ CHECK THE AIR CON WORKS (IF FITTED) ☐ REV TO 4000RPM FOR 4 SECONDS TO SCAVENGE OIL ☐ QUICKLY SHUT OFF AND CHECK OIL ☐ OIL LEVEL SHOULD BE IN THE MIDDLE OF MIN AND MAX ☐
13	**CHECK AIM SYSTEM:** DOWNLOAD DATA ☐ CHECK ALL SENSORS ☐ ZERO SENSORS ON FLAT PATCH ☐ MAKE SURE LATEST UPDATE DASH STILL WORKS AFTERWARDS ☐ ZERO DASH –MILES AND HOURS ☐ BEACON POINTING THE RIGHT WAY FOR THE TRACK ☐
14	**DRAIN FUEL TO MEASURE AMOUNT** ☐
15	**SAFETY CHECKS** CHECK THAT BELTS ARE SECURE, NO TEARS, WEAR MARKS & WITHIN EXPIRATION DATE ☐ CHECK FIRE EXTINGUISHER IS IN DATE AND NOT EMPTY ☐
16A	**SET DOWN ON CAR** WRITE DOWN THE SETTINGS ON THE CAR AS IT FINISHED THE LAST RACE ☐
16B	**SET UP CAR FOR NEXT TRACK** **IF THE DRIVER IS HAPPY WITH THE SET UP OF THE CAR THEN LEAVE THE SETTINGS AS THEY ARE**
17A	**VACUUM COCKPIT AND PEDAL BOX AND SIDE PODS** ☐
17B	**REFIT DIFFUSER AND BODYWORK, ENSURING LIGHTS ARE CONNECTED AND WORKING** ☐
18	**CHECK COCKPIT CONTROLS** ENSURE ALL COCKPIT CONTROLS WORK (TRY ALL THE BUTTONS) ☐
	FINAL CHECKS CHECK BODYWORK IS SECURED BY ALL PINS ☐ REAR TAIL PINS ADJUSTED CORRECTLY ☐ REAR TIE DOWNS ARE FITTED ☐ EVERYTHING THAT CAME OUT OF THE CAR IS BACK IN THE CAR ☐

SR1 SETUP SHEET



Note: When carrying out set-up on flat-patch, set tyre pressures to hot pressure. Ensure that they are returned to cold pressures after setup is complete.

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

SR3 RS SETUP SHEET

Camber				Toes			
-3.5			-3.5	2mm OUT			2mm OUT
-1.5			-1.5	3mm IN			3mm IN

Triple Intrax		Springs/Preload			Triple Intrax		Corner weights (Est)/ Drop Height		
Bump LS:	-14	90Nm	FARB	90Nm	Bump LS:	-14	75mm	Front diffuser H	75mm
Bump HS:	-25	100mm	Soft 15.8mm	100mm	Bump HS:	-25		40mm	
Rebound:	-25	Preload	Medium 19mm	Preload	Rebound:	-25		Ballast Weight	
Single Intrax		3 Turns	Hard 22.2mm	3 Turns	Single Intrax		168mm	80kg	168mm
-25			X Hard 22.2mm black		-25				
AVO		7"		7"	AVO		Weight Estimate	Cross%	Weight Estimate
+6		500lbs		500lbs	+6			49.3	
							142	Total weight kg	144
								600 +80kg BW*	
								Rake mm	
Triple Intrax		Springs/Preload			Triple Intrax		70mm	15mm	70mm
Bump LS:	-12	95Nm	RARB	95Nm	Bump LS:	-12			
Bump HS:	-25	100mm	Soft 12.7mm	100mm	Bump HS:	-25	220mm		220mm
Rebound:	-25	Preload	Medium 15.8mm	Preload	Rebound:	-25			
Single Intrax		0 Turns	Hard 19mm	0 Turns	Single Intrax		Weight Estimate	LHD / RHD	Weight Estimate
-25			X Hard 22.1mm		-25				
AVO		7"	Super hard 22.1 black	7"	AVO		173		184
+8		550lbs		550lbs	+8				

Dive planes:		Tyre Pressures PSI (Cold & Hot)			PADS
		24	Dunlop Tyre Compound	24	01
			392		
		29		29	
Rear bi wing					PADS
		24		24	01
		29		29	

SR8 Gearing	
Short	n/a
Medium	n/a
Long	n/a
X long	n/a

SR3 Gearing	
3.409	
3.235	
3.071	Std
2.917	

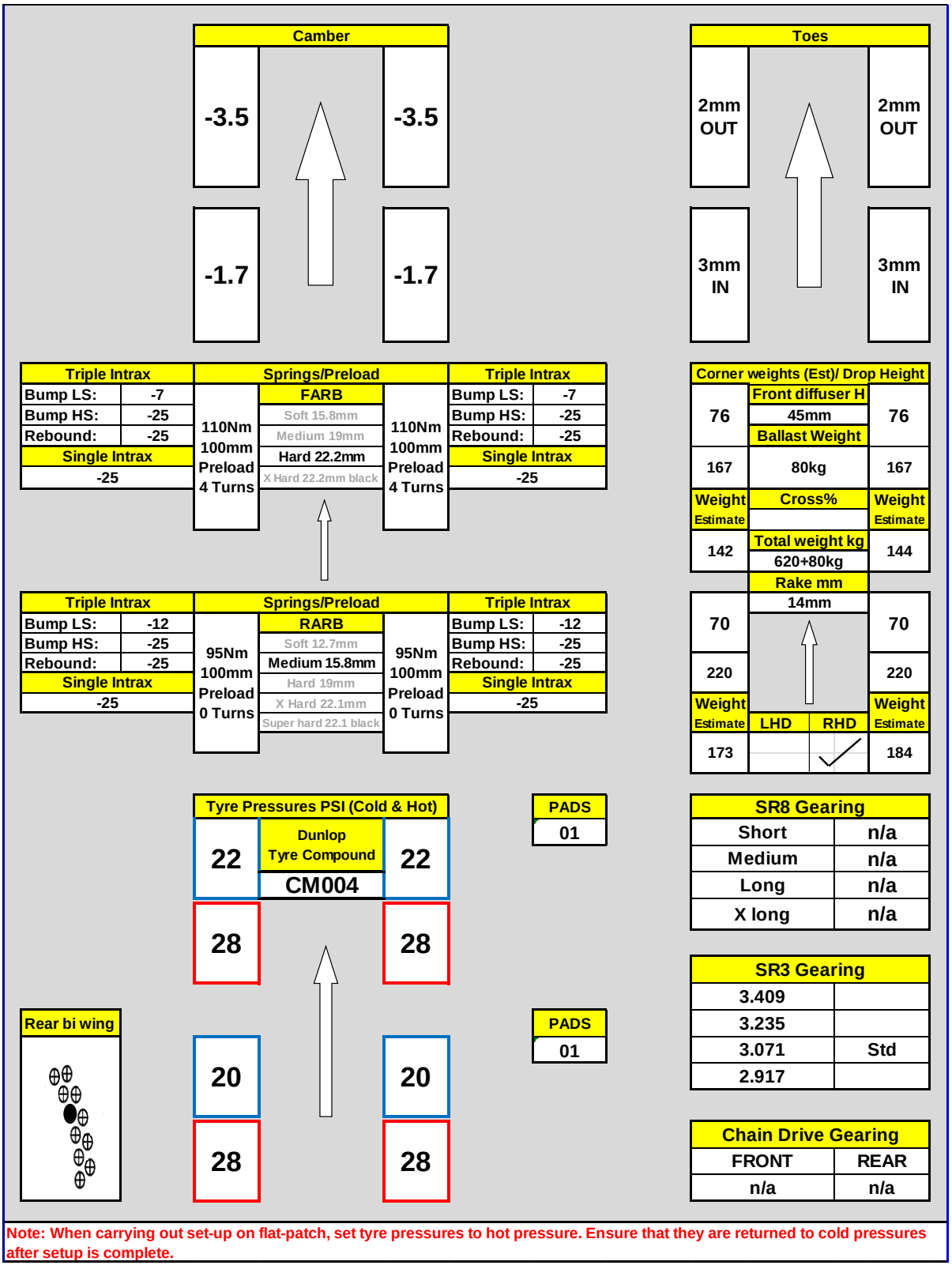
Chain Drive Gearing	
FRONT	REAR
n/a	n/a

Note: When carrying out set-up on flat-patch, set tyre pressures to hot pressure. Ensure that they are returned to cold pressures after setup is complete.

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

SR3 RSX SETUP SHEET



Note: When carrying out set-up on flat-patch, set tyre pressures to hot pressure. Ensure that they are returned to cold pressures after setup is complete.

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

SR8 SETUP SHEET

Camber		Toes	
-3.5	-3.5	2mm OUT	2mm OUT
-1.25	-1.25	3mm IN	3mm IN

Triple Intrax		Springs/Preload		Triple Intrax	
Bump LS:	-12	95Nm 100mm Preload 3 Turns	FARB	Bump LS:	-12
Bump HS:	-25		Soft 15.8mm	Bump HS:	-25
Rebound:	-25		Medium 19mm	Rebound:	-25
			Hard 22.2mm		
			X Hard 22.2mm black		

Triple Intrax		Springs/Preload		Triple Intrax	
Bump LS:	-10	110Nm 100mm Preload 0 Turns	RARB	Bump LS:	-10
Bump HS:	-25		Soft 12.7mm	Bump HS:	-25
Rebound:	-25		Medium 15.8mm	Rebound:	-25
			Hard 19mm		
			X Hard 22.1mm		
			Super hard 22.1 black		

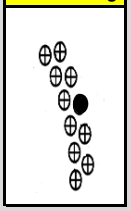
Corner weights(Est) / Drop Height		
75mm	Front diffuser H	75mm
	40mm	
	Ballast Weight	
168mm	80kg	168mm
Weight Estimate	Cross%	Weight Estimate
153	50.3	160
	Total weight kg	
	715 +80kg BW*	
	Rake mm	
70mm	15mm	70mm
220mm		220mm
Weight Estimate	LHD / RHD	Weight Estimate
222	✓	228

Dive planes:		Tyre Pressures PSI (Cold & Hot)		
		24	Dunlop Tyre Compound 720	24
		30 to 32		30 to 32
		24		24
		30 to 32		30 to 32

PADS
01

PADS
01

Rear bi wing



SR8 Gearing	
Short	
Medium	Std
Long	
X long	

SR3 Gearing	
3.409	n/a
3.235	n/a
3.071	n/a
2.917	n/a

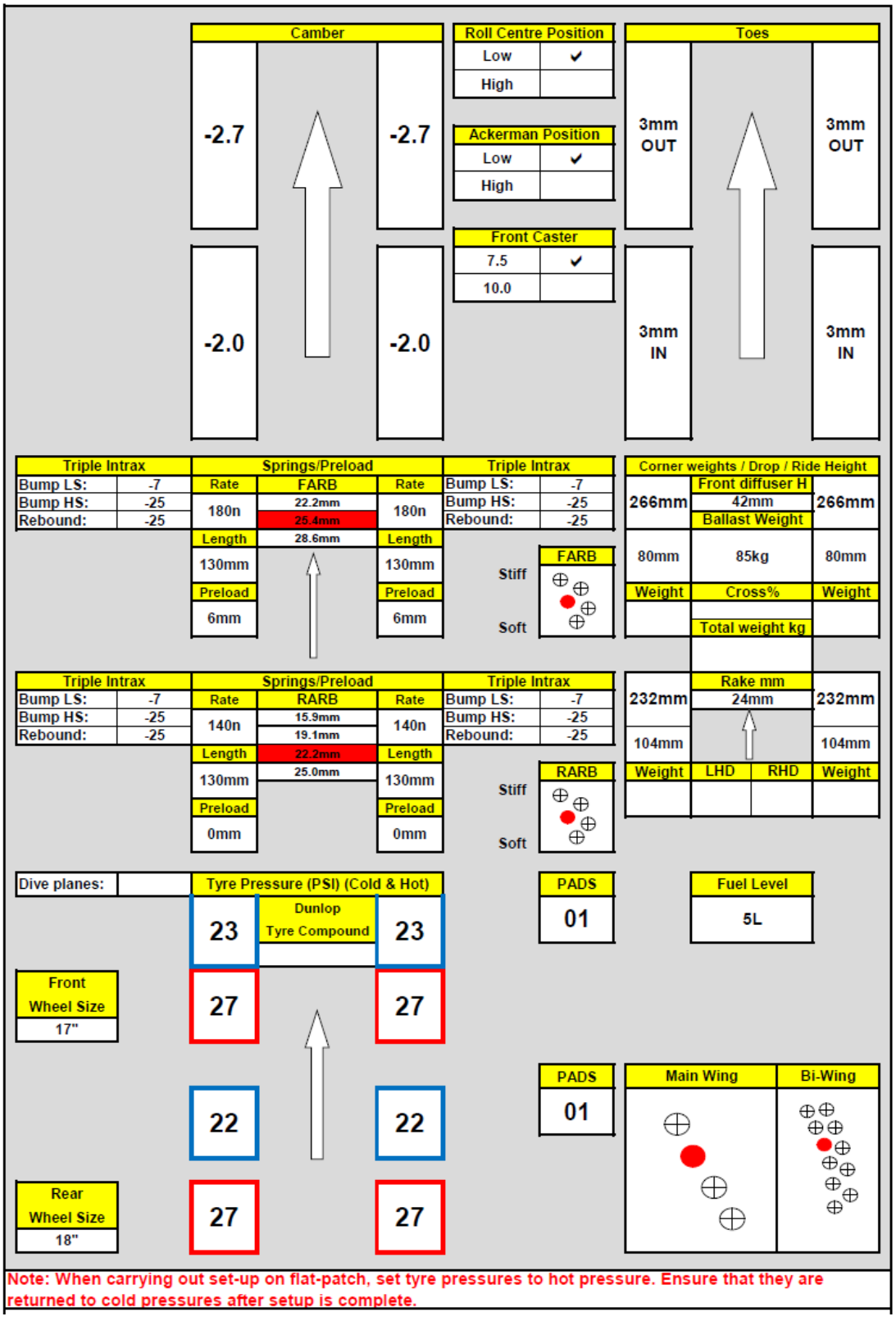
Chain Drive Gearing	
FRONT	REAR
n/a	n/a

Note: When carrying out set-up on flat-patch, set tyre pressures to hot pressure. Ensure that they are returned to cold pressures after setup is complete.

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

RXC / RXC SPYDER SETUP SHEET



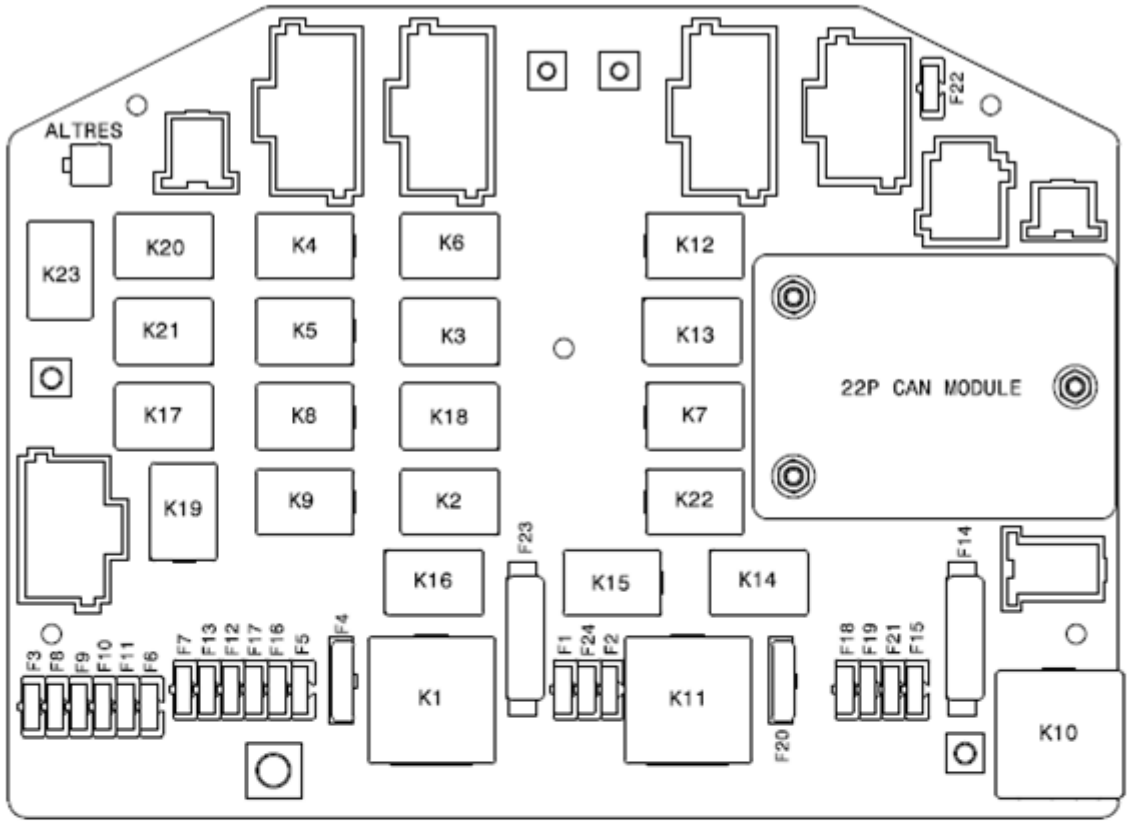
Note: When carrying out set-up on flat-patch, set tyre pressures to hot pressure. Ensure that they are returned to cold pressures after setup is complete.

SIMMS' MEDAL WINNER

NORDSCHLEIFE LAP RECORD HOLDER

RXC FUSE BOARD LAYOUT

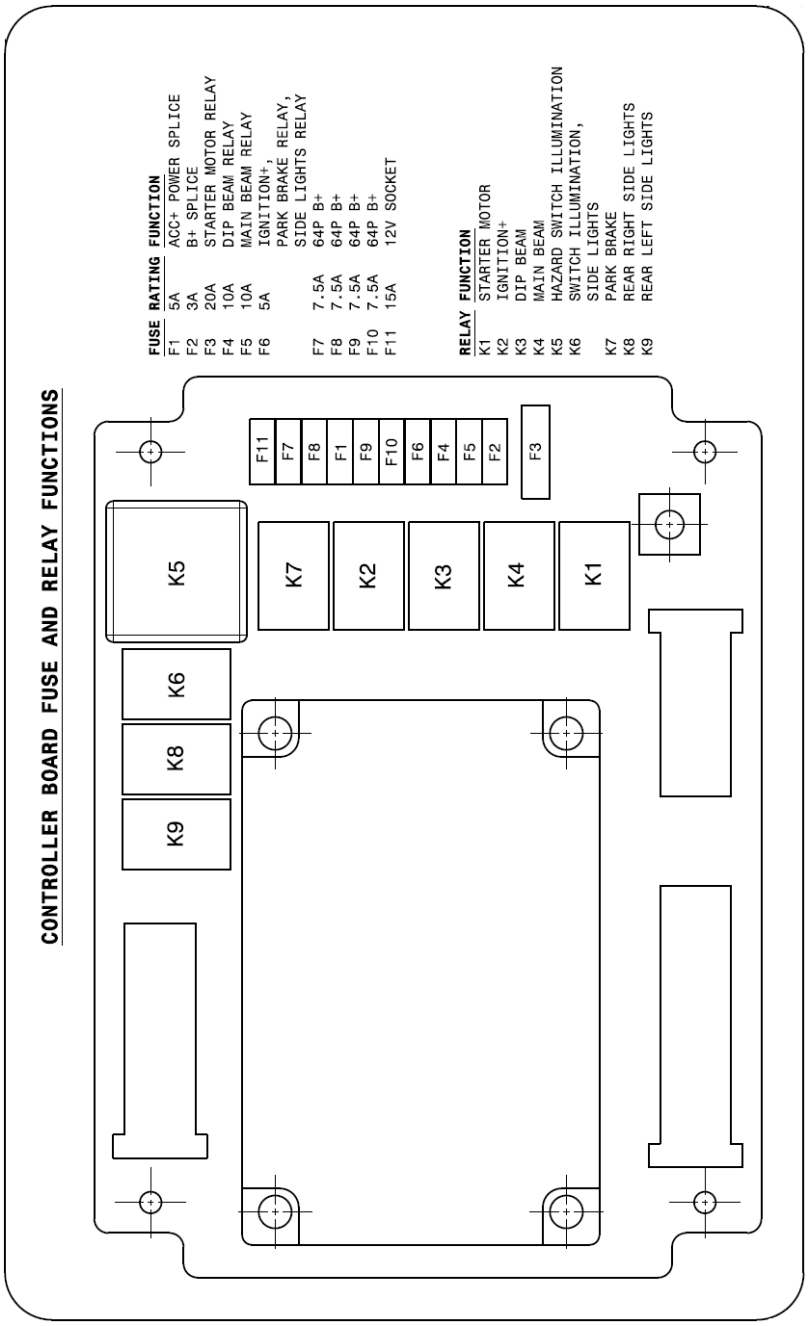
CONTROLLER BOARD FUSE AND RELAY FUNCTIONS



FUSE	RATING	FUNCTION
F1	15A	12V SOCKET
F2	5A	ACCESSORY +VE
F3	3A	B+ HAZARD SW / INT LIGHTS
F4	20A	STARTER SOLENOID
F5	5A	IGNITION +VE
F6	10A	DIP BEAM
F7	10A	MAIN BEAM
F8	7.5A	64P B+
F9	7.5A	64P B+
F10	7.5A	64P B+
F11	7.5A	64P B+
F12	10A	CONDENSOR FAN
F13	5A	REVERSE LIGHTS
F14	60A	POWER STEERING
F15	15A	IGNITION +VE (SPARE)
F16	5A	IMMOBILISER
F17	7.5A	B+ (SPARE)
F18	10A	AIR CONDITIONING
F19	7.5A	HORN
F20	20A	HEATED SCREEN
F21	15A	CAMERA
F22	15A	ACCESSORY / IGNITION +VE 22P
F23	30A	WIPERS
F24	15A	ACCESSORY +VE (SPARE)

RELAY	FUNCTION
K1	ACCESSORY POWER RELAY
K2	STARTER SOLENOID
K3	IGNITION +VE
K4	DIP BEAM
K5	MAIN BEAM
K6	PARK BRAKE
K7	DISPLAY BACKLIGHTING
K8	CONDENSOR FAN
K9	REVERSE LIGHTS
K10	IGNITION POWER RELAY
K11	IGNITION POWER RELAY
K12	AIR CONDITIONING
K13	HORN
K14	HEATED SCREEN
K15	WIPER SLOW
K16	WIPER FAST
K17	GEAR COMPRESSOR
K18	IGNITION CONTROL
K19	FUEL
K20	FAN
K21	FAN 2
K22	LOAD DUMP
K23	ECU ANALOGUE GROUND

Jan 2014 onwards


CONTROLLER BOARD FUSE AND RELAY FUNCTIONS
FUSE RATING FUNCTION
F1 5A ACC+ POWER SPLICE
F2 3A B+ SPLICE
F3 20A STARTER MOTOR RELAY
F4 10A DIP BEAM RELAY
F5 10A MAIN BEAM RELAY
F6 5A IGNITION+, PARK BRAKE RELAY, SIDE LIGHTS RELAY
F7 7.5A 64P B+
F8 7.5A 64P B+
F9 7.5A 64P B+
F10 7.5A 64P B+
F11 15A 12V SOCKET
RELAY FUNCTION
K1 STARTER MOTOR
K2 IGNITION+
K3 DIP BEAM
K4 MAIN BEAM
K5 HAZARD SWITCH ILLUMINATION
K6 SWITCH ILLUMINATION, SIDE LIGHTS
K7 PARK BRAKE
K8 REAR RIGHT SIDE LIGHTS
K9 REAR LEFT SIDE LIGHTS
F11 F7 F8 F1 F9 F10 F6 F4 F5 F2
F3
K5 K7 K2 K3 K4 K1
K6 K8 K9

Pre Jan 2014

DOCUMENT REVISION HISTORY

2015-10-27 – V4.3 JS – V6 straight ratio correction, RXC fuse board diagrams added, staff contacts updated