



Wolf GB08 Tornado Extreme

Technical information v00_2023-01-25



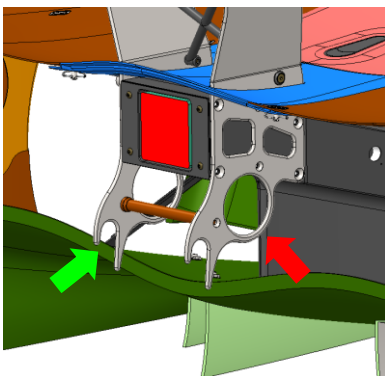
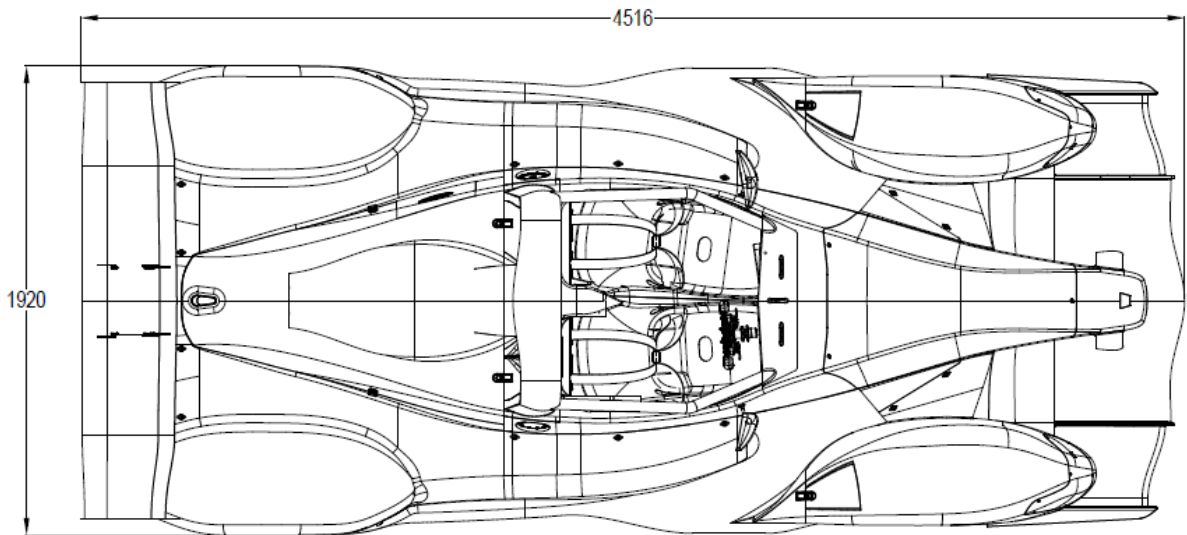
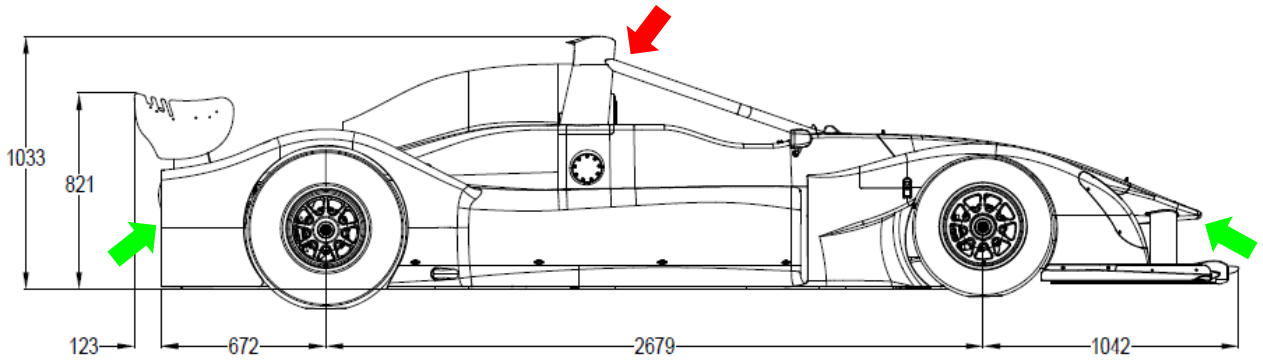
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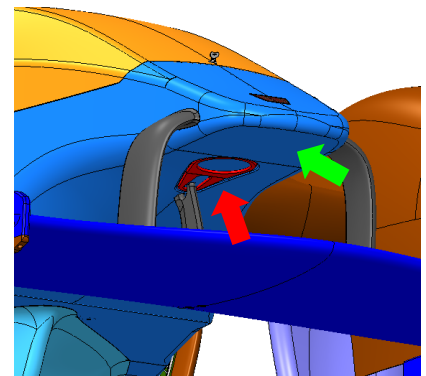
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General dimensions




Dry weight *	690 kg
Wheelbase	2679 mm

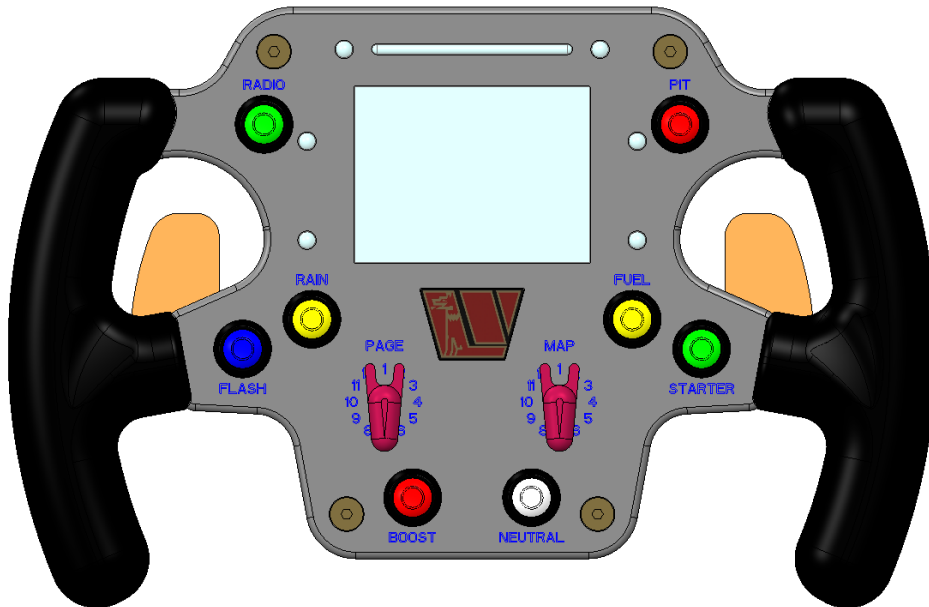
* configuration dependent



 Tow point

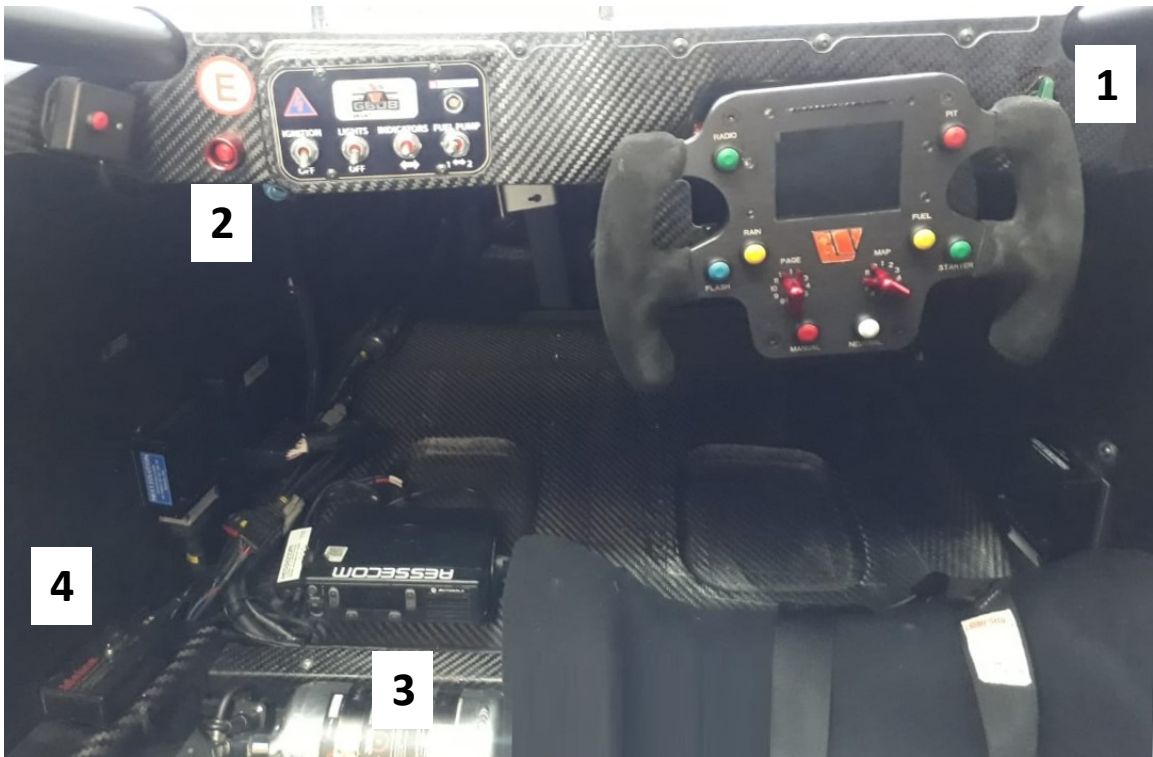
 Lifting point with manual or pneumatic jack

Steering wheel



- RADIO** press and hold to talk in radio
- PIT** press to switch on/off pitlane limiter
- RAIN** press for 3 sec. to switch on/off rain light
- FUEL** press to reset fuel consumption, will be reset also data for lap time predict (necessary when change track length)
- FLASH** press for light flashing (3 times)
- STARTER** press for engine start
- BOOST** press for temporary boost in overtaking (to be configure)
- NEUTRAL** press for first gear and for neutral
- PAGE 1-6** race setting view (engine parameter, lap time) with different brightness level (from 6x to 1x)
- PAGE 7-8** qualify setting view (speed, lap time, predict lap time) with different brightness level (from 6x to 1x)
- PAGE 9** check output current load
- PAGE 10** check output current load
- PAGE 11** check brake bias value
- PAGE 12** check engine/chassis parameters
- MAP 1-12** change engine parameter (to be configure)

Cockpit



- 1 brake bias, 1 complete clockwise turn gives 2% in front braking
- 2 push for extinguisher action
- 3 extinguisher nozzle
- 4 extinguisher control unit



IGNITION
LIGHTS
INDICATORS
FUEL PUMP
DOWNLOAD

main switch: off, on, ignition
switch on front/rear light
switch right/left indicator
fuel pump 1 (main) or pump 2 (reserve) if present
plug for data download and ECU mapping

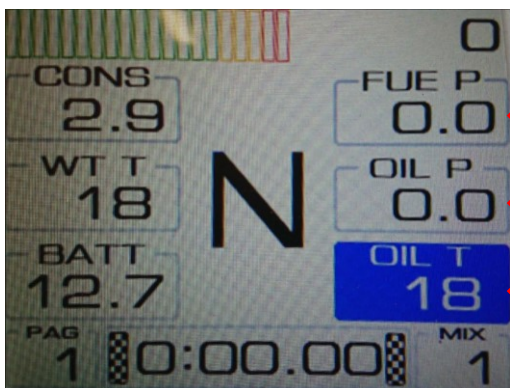


Recommended engine values

Ford 5.2 V8		
	Range	Alarm
Rpm	4500-7800	> 8200
Water temp. (°C)	95-110	> 115
Oil temp. (°C)	105-135	> 140
Oil press. (bar)	3,5-6	< 2,5
Battery (V)	12,5-14	< 11,5

Engine fire-up

1. Move the IGNITION switch from OFF to CENTRAL position
2. Push the STARTER button on the steering wheel until OIL PRESSURE became more than zero
3. Move the IGNITION switch from CENTRAL position to UP position
4. Check if the FUEL PRESSURE is about 5 bar (70 psi)
5. Connect external power supply in the red plug on rear crash-box
6. Push the STARTER button without throttle, the engine will start
7. Oil PRESSURE and TEMPERATURE will be highlighted in BLUE until the engine warm-up is not completed





First shakedown

These steps need to be done after car delivering:

1. Generally look at car to exclude any damage during transport
2. Use only **102 octane** fuel
3. Warm up the car and check water and oil levels
4. Run one installation lap at 50% of car's performance
5. Remove complete bodywork and check for any fluid leaks in car systems (cooling, engine oil, gearbox, brake)
6. Check if suspension bolts are correctly tighten
7. If everything goes well do run for 5 laps at 80% of car's performance
8. Check again for any fluid leaks
9. Run at 100% of car's performance with your scheduled test following the instructions in this handbook

Chassis setup

	Front	3° Front Elements	Rear
H	40 mm		85 mm
Toe	15' OUT		0
Caster	std		Std
Spring	700 (Preload: 2T)	700 (Preload: 0T)	1000 progressive** (Preload: 0T)
Packer (Gap)	No	Yes (10 mm)	
Dampers	B: -7 R: -1	B: -7 R: -5	B: -10 R: -8
Camber	3,2° (Hankook)		2,6° (Hankook)
Anti roll-bar	D33x5 P 3:3		Disconnect
Pads (sprint caliper)	RB170		RB170
Pads (endurance caliper)	RB340		RB340

** Wolf Racing Cars special parts (from 1000 to 1300 compression dependant)

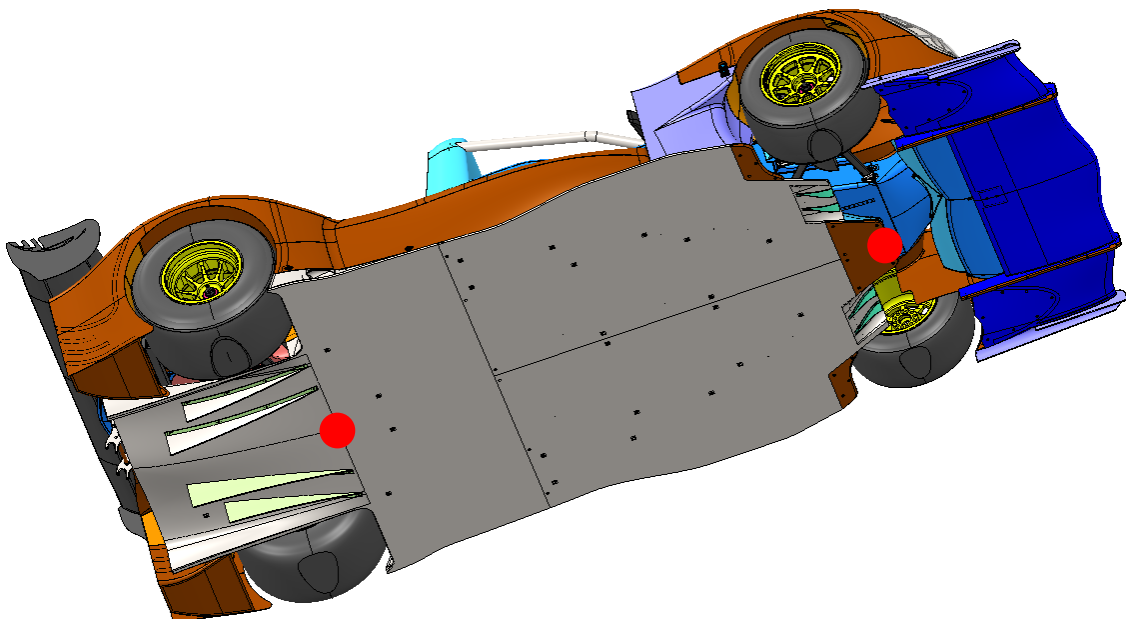
Progressive



Linear (standard)



Reference points for height measure



Setup setting

SLICK TIRES	
Rear wing FAST TRACK	P8 (without top front flap)
Rear wing MID SPEED TRACK	P12 (with both front flaps)
Front tire pressure (cold)	0,90 bar
Rear tire pressure (cold)	0,95 bar
Front tire pressure (hot)	1,45 bar
Rear tire pressure (hot)	1,45 bar

RAIN TIRES	
Rear wing (if very wet track)	add 1-2 holes to slick setup
Camber (if very wet track)	add 4 mm (+1°) shim each wheel
Front tire pressure (cold)	1,30 bar
Rear tire pressure (cold)	1,30 bar
Front tire pressure (hot)	1,60 bar
Rear tire pressure (hot)	1,60 bar

ADJUSTMENT		
Front height (mm)	1 pushrod turn	4,9 mm
Rear height (mm)	1 pushrod turn	6,2 mm
Camber	shim 1 mm thickness	0,25°

Tires and rims

PIRELLI slick

	Front	Rear
Compound	DM	DS
Tire	25/57,5-13	32,5/66-13
Rim	10"x13"	13,7"x13"
Overall diameter (mm)	575	650
Overall width (mm)	290	378

HANKOOK slick

These rear tires need to be absolutely stabilized at 1,40 bar, above 1,45 the tyre's shoulders not working well and the grip drops drastically

	Front	Rear
Compound	C92	C92
Tire / Rim	24/57-13	32/66-13
Rim	10"x13"	13,7"x13"
Overall diameter (mm)	572,7	655,5
Overall width (mm)		

AVON slick

	Front	Rear
Compound	222	222
Tire	24,5/57-13	31,5/66-13
Rim	10"x13"	13,7"x13"
Overall diameter (mm)	555	654
Overall width (mm)	287	381

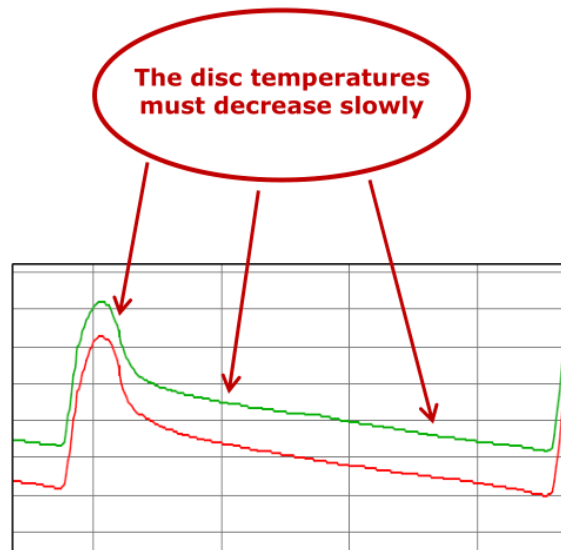
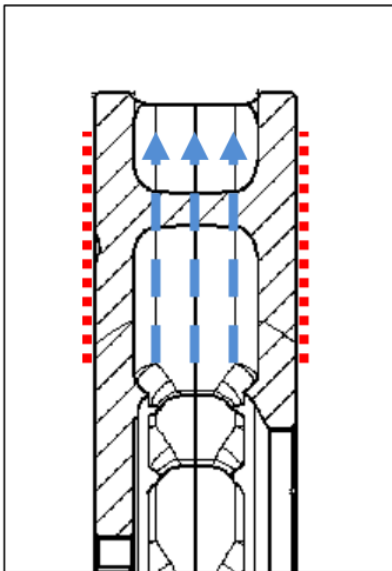


Brakes

- The only compounds of the pads available is the one supplied by Wolf Racing Cars
- To complete a correct bedding of discs and pads, proceed as follows:
 1. Perform, with normal braking power, 2-3 laps or in any case until the pedal stroke becomes long and the system loses braking power
 2. Come back to the pit and rest the system until its completely cooled
 3. At this point the bedding is finished and the braking system is full ready

Endurance brake system

- The cooling capacity of the endurance brake system, along with the air ducts on the car, is very efficient and is able to dissipate quickly the high brake energy levels
- The internal cooling of the disc is able to provide a quick reduction of the temperature: the difference in temperature between the disc surfaces and the core of the disc and also the slope of the cooling curve (see images below) must be controlled with the blanking of the air ducts on the car according to different factors:
 1. Low temperature conditions during the events
 2. Circuits with long straights and long time for cooling among the stops
 3. Frequent out-in sessions
- The reduction of the air flow will help to avoid the stresses on the braking surfaces due to thermal shock, which is the main cause of disc cracks



- Good temperature are 350°C at the start of braking and around 550°C at the end of braking; fading appears when the temperature is above 550°C at the start of braking
- Brake disc need to be change when radial crack is more than 2/3 of braking surface width; change also the disc if the crack start from inner diameter of braking surface

Antiroll bars

FRONT ARB Stiffness @ wheel (kg/mm)

	1-1	2-2	3-3	4-4	5-5
O.D. 11,5	30,7	23,6	18,7	15,2	12,6
O.D. 15	88,8	68,2	54,0	43,9	36,3
O.D. 18,75X2,5	154,1	118,4	93,8	76,1	63,0
O.D. 24,5X2,5	437,1	335,9	266,1	216	178,9
O.D. 28X3,5	851,5	654,2	518,3	420,8	348,4
O.D. 33X5	1589,1	1220,9	967,3	785,2	650,1

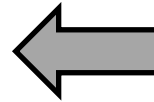
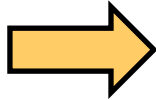
REAR ARB Stiffness @ wheel (kg/mm)

	1-1	2-2	3-3	4-4
O.D. 12,5 Width 160	91,6	60,3	42,7	31,8
O.D. 17x3 Width 160	390,1	246,9	170,1	124,3
O.D. 14x10 Width 175	106,6	70,2	49,7	36,9

Damper adjustment

- Same front and rear dampers
- Click 0: completely closed (clockwise) max bump/rebound
- Click -20: completely open (anti-clockwise) min bump/rebound

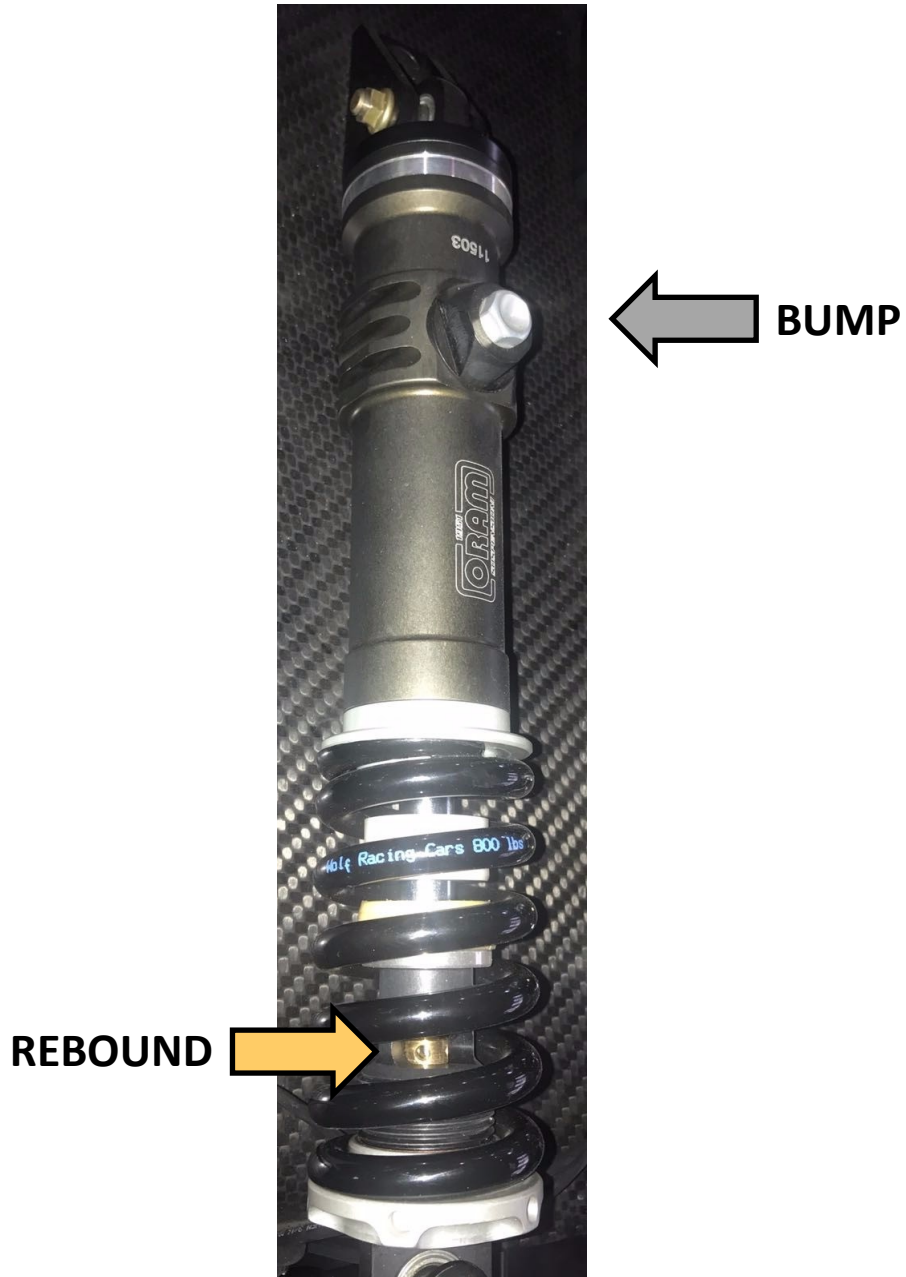
REBOUND



BUMP

Front central dampers adjustment

- Click 0: completely closed (clockwise) max bump/rebound
- Click -20: completely open (anti-clockwise) min bump/rebound



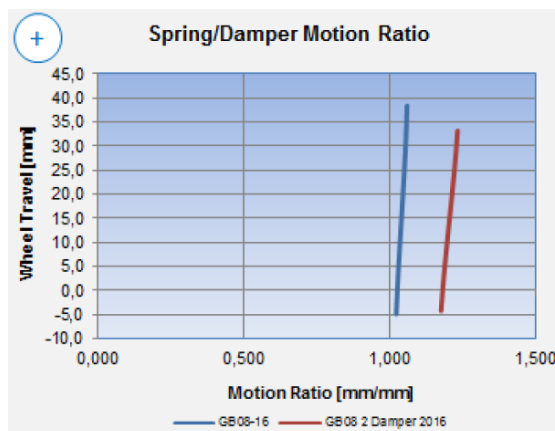
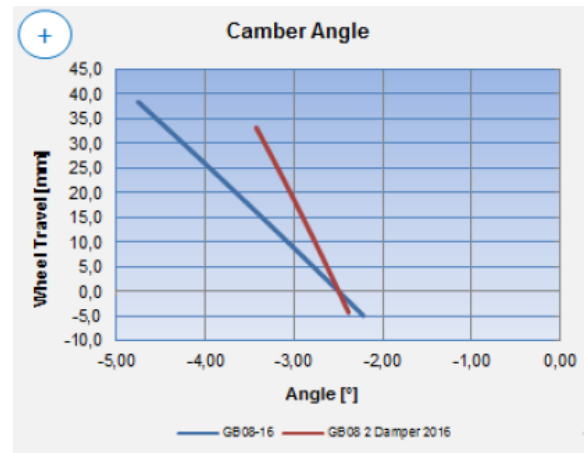
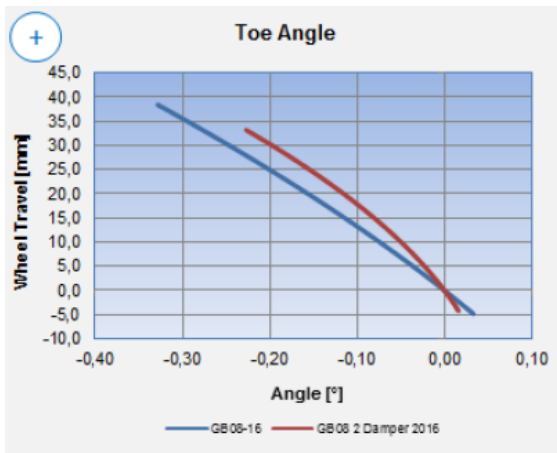
Front suspension geometry

CALCULATION RESULTS - STATIC SUSPENSION SYSTEM DESIGN PARAMETERS

Bump Steer [°/m]	Camber Gain [°/m]	Roll Center Height [mm]	Roll Center Height Movement / Wheel Travel Ratio [-]	Spring/Damper Travel / Wheel Travel Ratio [-]	Wheel Center Anti-Angle [°]	Contact Patch Anti-Angle [°]
-7,03	-56,82	162,48	1,55	1,02	1,69	-3,38

CALCULATION RESULTS - STATIC STEERING SYSTEM DESIGN PARAMETERS

Toe [°]	Camber [°]	Caster [°]	Caster Trail [mm]	KPI [°]	Scrub Radius [mm]	KPI Off. [mm]	Caster Off. [mm]
0,00	-2,50	8,60	22,46	17,09	21,44	94,23	-19,27



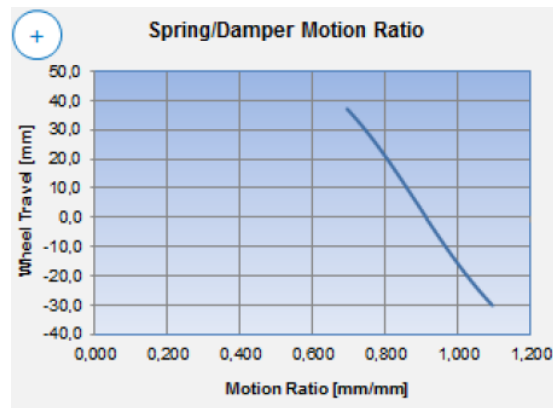
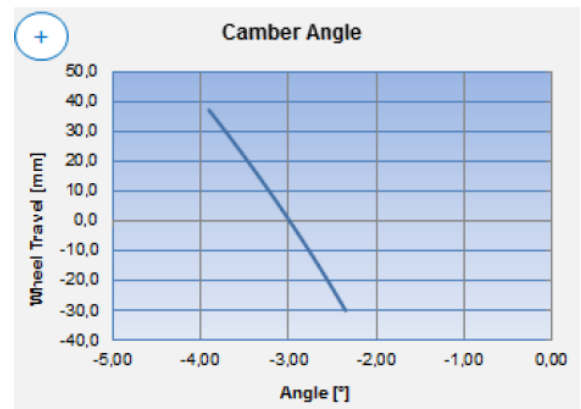
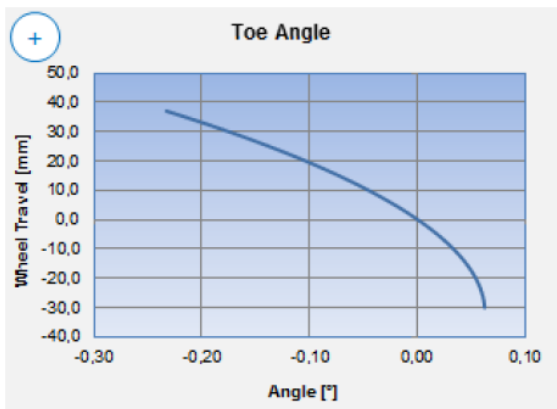
Rear suspension geometry

CALCULATION RESULTS - STATIC SUSPENSION SYSTEM DESIGN PARAMETERS

Bump Steer [%m]	Camber Gain [%m]	Roll Center Height [mm]	Roll Center Height Movement / Wheel Travel Ratio [-]	Spring/Damper Travel / Wheel Travel Ratio [-]	Wheel Center Anti-Angle [°]	Contact Patch Anti-Angle [°]
-3,92	-22,73	21,32	1,02	0,91	2,43	4,56

CALCULATION RESULTS - STATIC STEERING SYSTEM DESIGN PARAMETERS

Toe [°]	Camber [°]	Caster [°]	Caster Trail [mm]	KPI [°]	Scrub Radius [mm]	KPI Off. [mm]	Caster Off. [mm]
0,00	-3,00	-23,23	-87,99	13,02	32,87	89,14	47,08

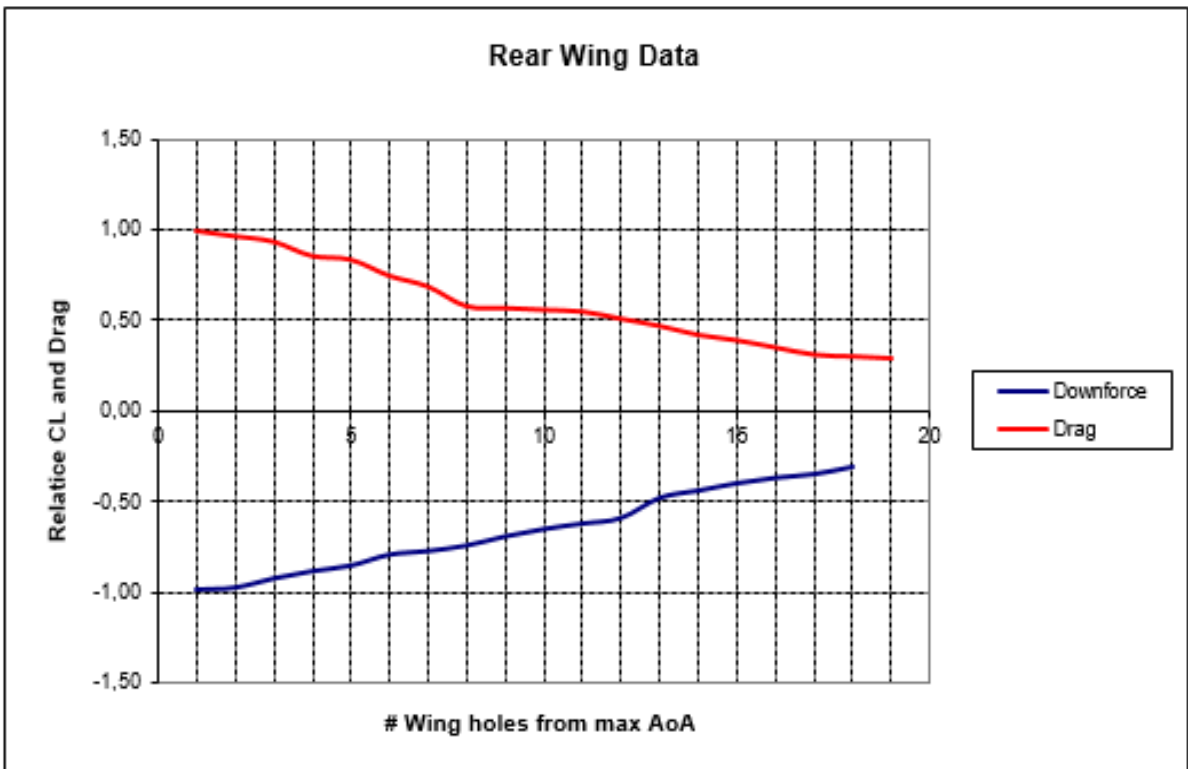
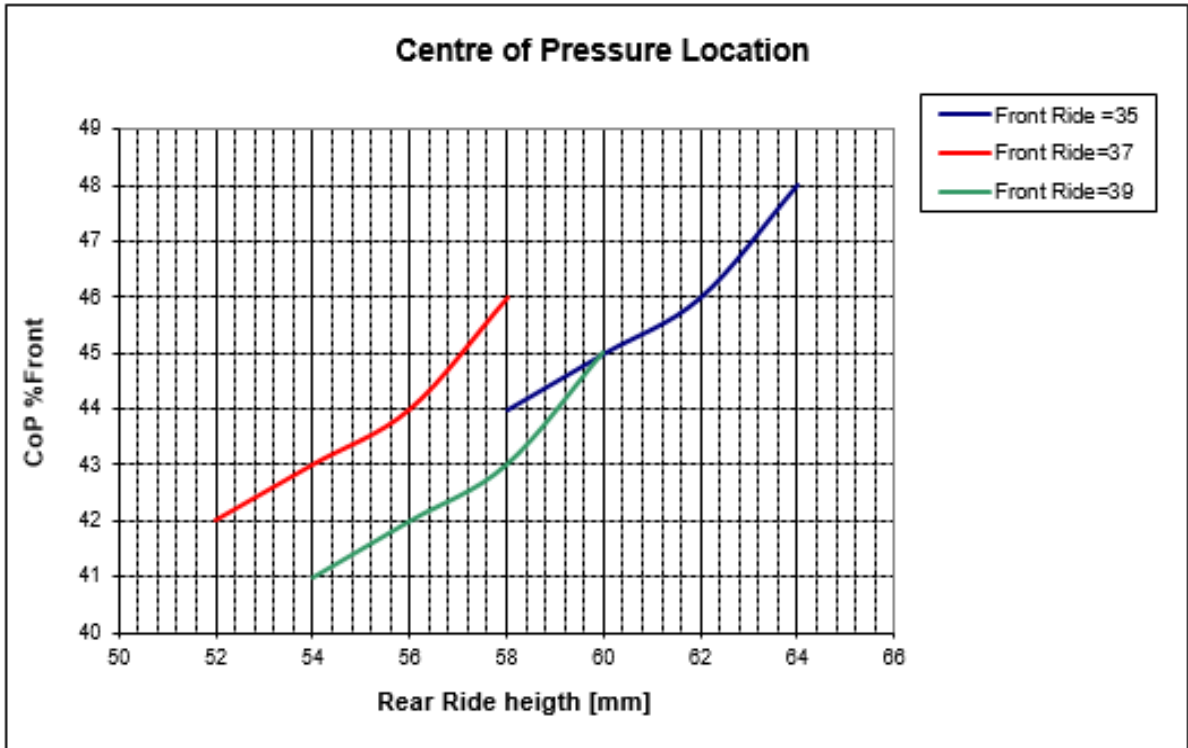


Aerodynamic data

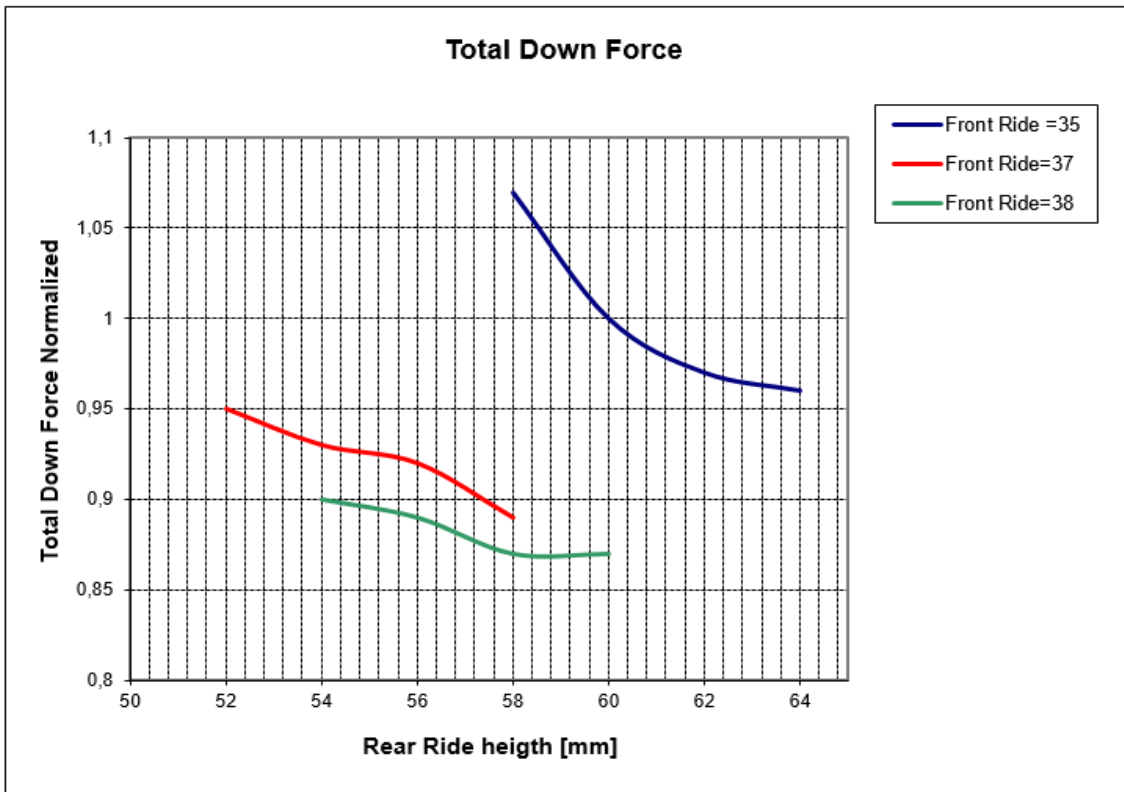
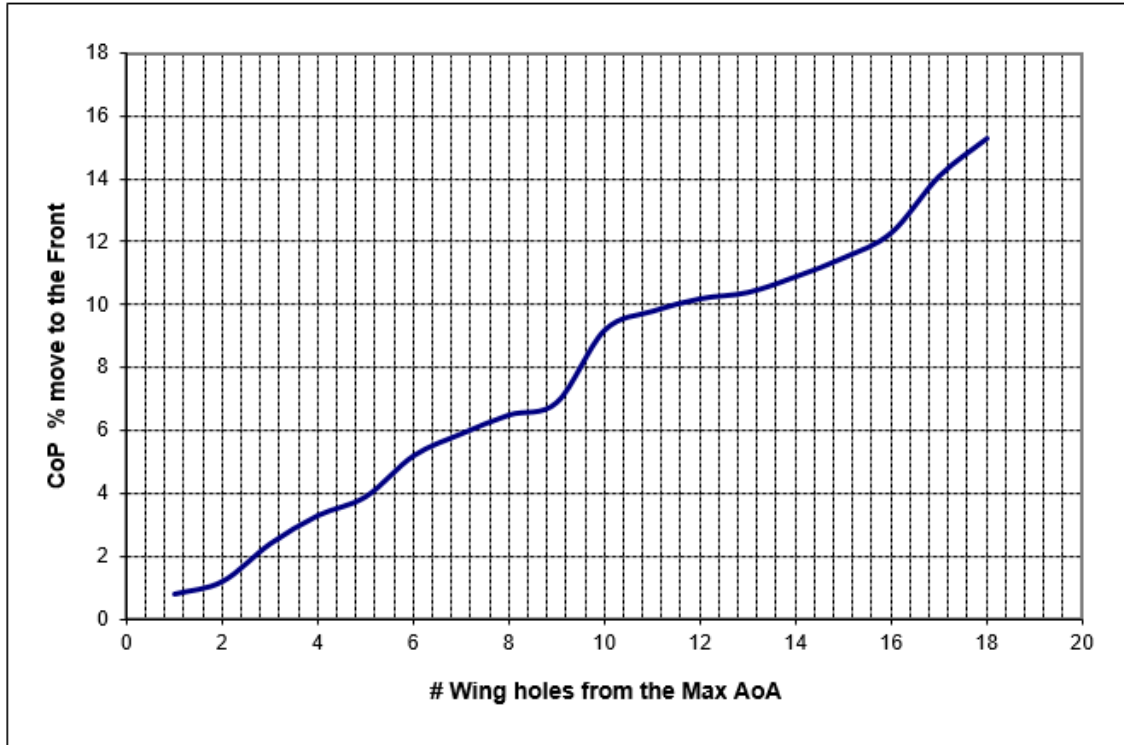
Project:	GB08-16 Tornado		
Data Type:	Aero balance		
Nominal Setting:	Front Ride Heigh	35	mm
	Rear Ride Height	60	mm
	Rear Wing	Full Loaded	
	Downforce distr.	45%	front
		55%	rear
	Downforce total	1	

Front ride height	Rear ride height	Total downforce	CoP %front
30	45	0,97	48
33	48	0,95	47
35	58	1,07	44
35	60	1	45
35	62	0,97	46
35	64	0,96	48
37	52	0,95	42
37	54	0,93	43
37	56	0,92	44
37	58	0,89	46
38	54	0,9	41
38	56	0,89	42
38	58	0,87	43
38	60	0,87	45

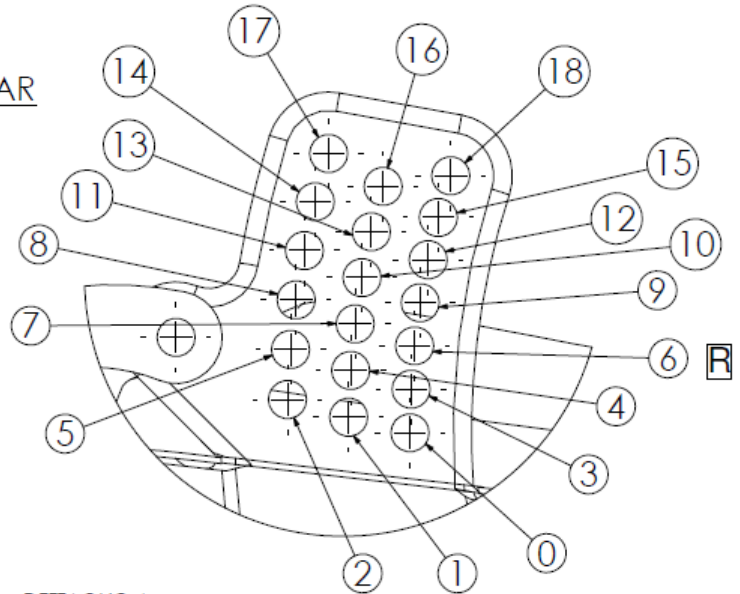
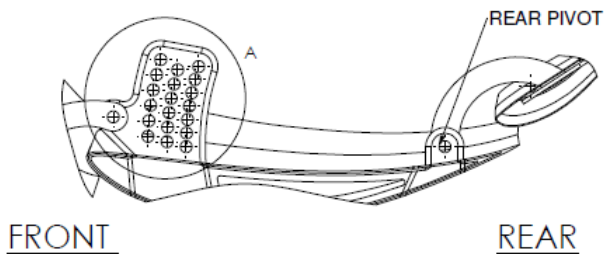
Aerodynamic data



Aerodynamic data



Rear wing adjustment



DETTAGLIO A
SCALA 1.5 : 1

OPERATION AT RACE TRACK :

- 1) **DO NOT** USE CLINOMETER TO SET ATTACK ANGLE
- 2) POS. #6 **R**
REFERENCE ATTACK ANGLE
- 3) DOWNFORCE AND DRAG DELTA %
WITH REFERENCE TO #18
(MAX DOWNFORCE)
AS SHOWN ON THE TABLE
- 4) OPTIMAL RANGE OF OPERATION
POS# 2 -POS#14

REAR WING AERO DATA				
Rear wing #holes	-CL	Drag	Efficiency [-L/D]	CoP %Front Move
18	-1	1	1	0
17	-0,98	0,97	1,01030928	0,8
16	-0,97	0,94	1,03191489	1,2
15	-0,92	0,86	1,06976744	2,4
14	-0,88	0,84	1,04761905	3,3
13	-0,85	0,75	1,13333333	3,9
12	-0,79	0,69	1,14492754	5,2
11	-0,77	0,58	1,32758621	5,9
10	-0,74	0,57	1,29824561	6,5
9	-0,69	0,56	1,23214286	6,9
8	-0,65	0,55	1,18181818	9,2
7	-0,62	0,51	1,21568627	9,8
6	-0,59	0,47	1,25531915	10,2
5	-0,48	0,42	1,14285714	10,4
4	-0,44	0,39	1,12820513	10,9
3	-0,40	0,35	1,14285714	11,5
2	-0,37	0,31	1,19354839	12,3
1	-0,35	0,30	1,16666667	14,1
0	-0,31	0,29	1,06896552	15,3

Checking and replacing components

Checking after every race/daily test

- General chassis bolts
- Air filter cleaning
- Water radiator air cleaning
- Brake bleeding
- Power steering screws
- Clean and lubricate with copper grease wheel stud and nut
- Check the wheel nut retainer; pins need to move freely and shouldn't be worn

Checking after every year

- Power steering brackets
- Pedal assembly

Replacement

- Every 4h: oil and oil filter
- Every 6-8h: spark plugs
- Every 10h: gearbox oil
- Every 20h: O2 sensors

Engine rebuilt

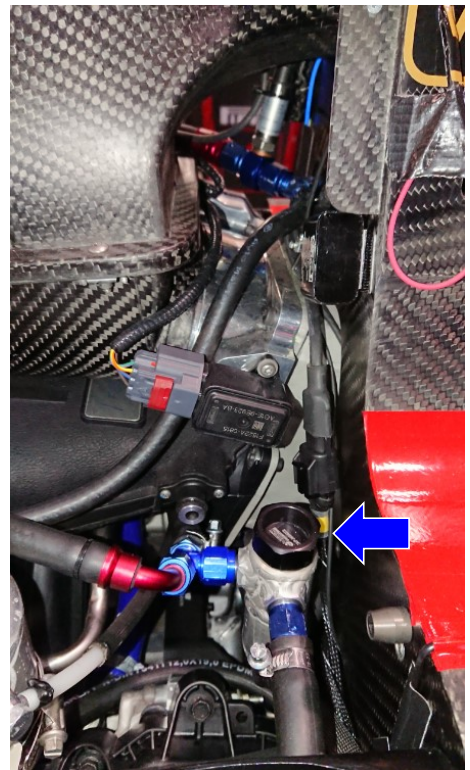
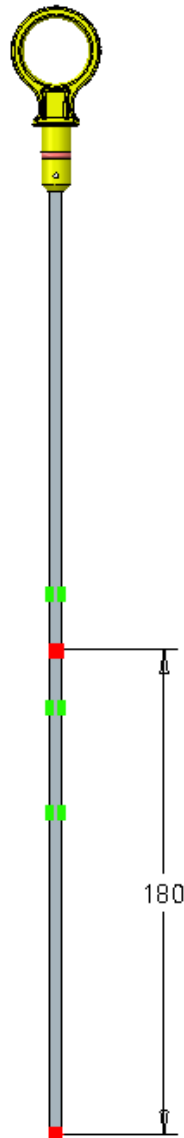
- Need to be done every 40h

Tightening torque

COMPONENT	TIGHTENING TORQUE	THREADLOCKER
Wheel nut: RED Clockwise GREEN Counterclockwise	200Nm	No
Front wheel stud/CV joint nut	350Nm	Strong (Loctite 270)
Upright stud nut	90Nm	No
Wishbone/pushrod uniball nut	27Nm	No
Wishbone bracket chassis/gearbox side	30Nm	Medium (Loctite 243)
Caliper nut on upright	70Nm	No
Drive pegs	70Nm	Strong (Loctite 270)

Checking engine oil level

- Warm-up engine until oil temp is 40°C and water temp is 80°C
- Kill the engine
- Remove oil dipstick (red arrow), wipe it with a clean cloth, replace the dipstick and remove it again to check the oil level
- Right oil level is when dipstick is wet for 180mm (halfway between the middle and the highest notch)
- If level is not right add engine oil by oil-tank cap (blue arrow)
- Check level again repeating the procedure



Cooling circuit filling

- Fill the cooling circuit until 1/2 of swirl pot volume (see image)



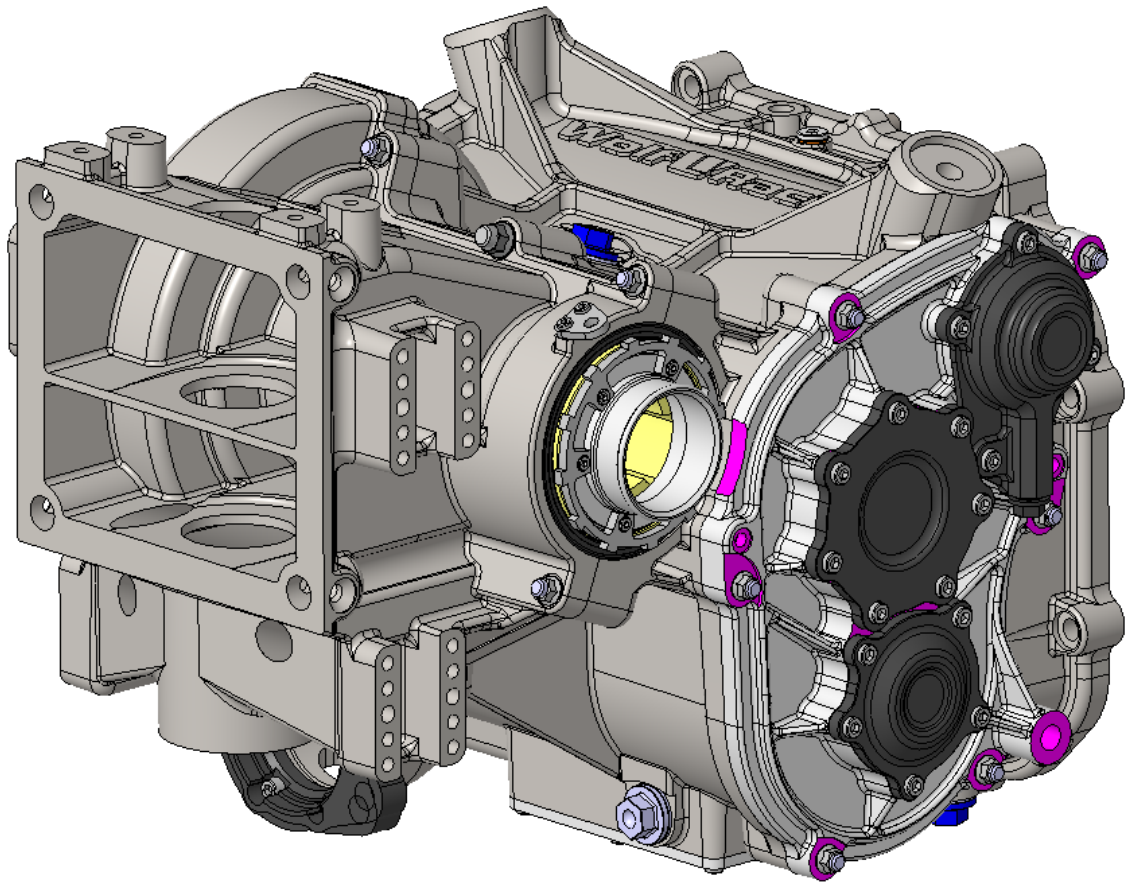
- Use screw on left side pipe (see image) and on screw on the top of both radiators for bleed air from circuit



- Do first test session (with water temperature around 80°C)
- When circuit is cold refill again until 1/2 of swirl pot volume

Gearbox

Please refer to handbook «[RC184 Gear Box Technical Details](#)» for all technical information about gearbox.



Oil and lubricant



Engine oil
Kennol Ultima 20W60
Quantity: 11lt



Brake fluid
Castrol SRF FMVSS 116 DOT 4



Gearbox oil
Kennol Ultima 75W140
Quantity: 2lt



Engine cooling
Total Glacelf (mixed with distilled water)
Total quantity: about 10,5lt



General agreement

- Motorsport is not covered by warranty for the voluntary and intentional choice of drivers to compete in a dangerous environment
- Monocoque, rollover structures, steering column, front and rear crash boxes are **Safety Components** approved by FIA
- **Safety Components** cannot be modified
- Any repairs on **Safety Components** need to be done in WOLF RACING CARS factory or in centers recognised by FIA
- After 2 years or after any major accident **Safety Components** need to be checked
- It is mandatory the use of original spare parts supplied by WOLF RACING CARS



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