SEAT SPORT

LEON CUP RACER

2016 TCR

MANUAL DE USUARIO

USER MANUAL

INDEX

1 TECHNICAL INFORMATION

1.1 SEAT Leon Cup Racer TCR display

Engine

\ Type	Turbocharged; 4-cylinder in line
\ Fuel supply system	Direct fuel injection
\ Cylinder capacity	1984 cm^3
\ Bore and stroke	82,5 mm x 92,8 mm
\ Maximum power	330 HP / 6250 rpm
\ Maximum torque	410 Nm / 2000 to 5000 rpm
\ Electronic control unit	Continental SIMOS
\ Exhaust	Twin-end racing catalysed 114 dB
\ Fuel tank	100 l FIA FT3 Fuel Tank
\ Speed limiter (Virtual Safety Car)	5 variable speeds
\ Start rev limiter	4200 rpm

Transmission

\ Transmission	Front-wheel drive
\ Gearbox	6 speed sequential
\ Differential	LSD with external preload adjustment
\ Clutch	2 plate cerametallic race clutch
\ Shift control	Paddle-shift on steering wheel

Chassis and Suspension

\ Front suspension	McPherson, adjustable in height, toe and camber
\ Anti-roll bar	Front and rear adjustable
\ Rear suspension	Multi-link adjustable in height, toe and camber
\ Front brakes	6-piston callipers, 378 mm steel ventilated discs
\ Rear brakes	272 mm steel discs
\ Brake pedal	Unitary with brake balance regulation
\ Hand brake	Hydraulic with mechanical locking
\ Steering system	Full electrical power steering rack
\ Rims	Seat Sport 10”x18”
\ ABS	Removed

Body and aerodynamics

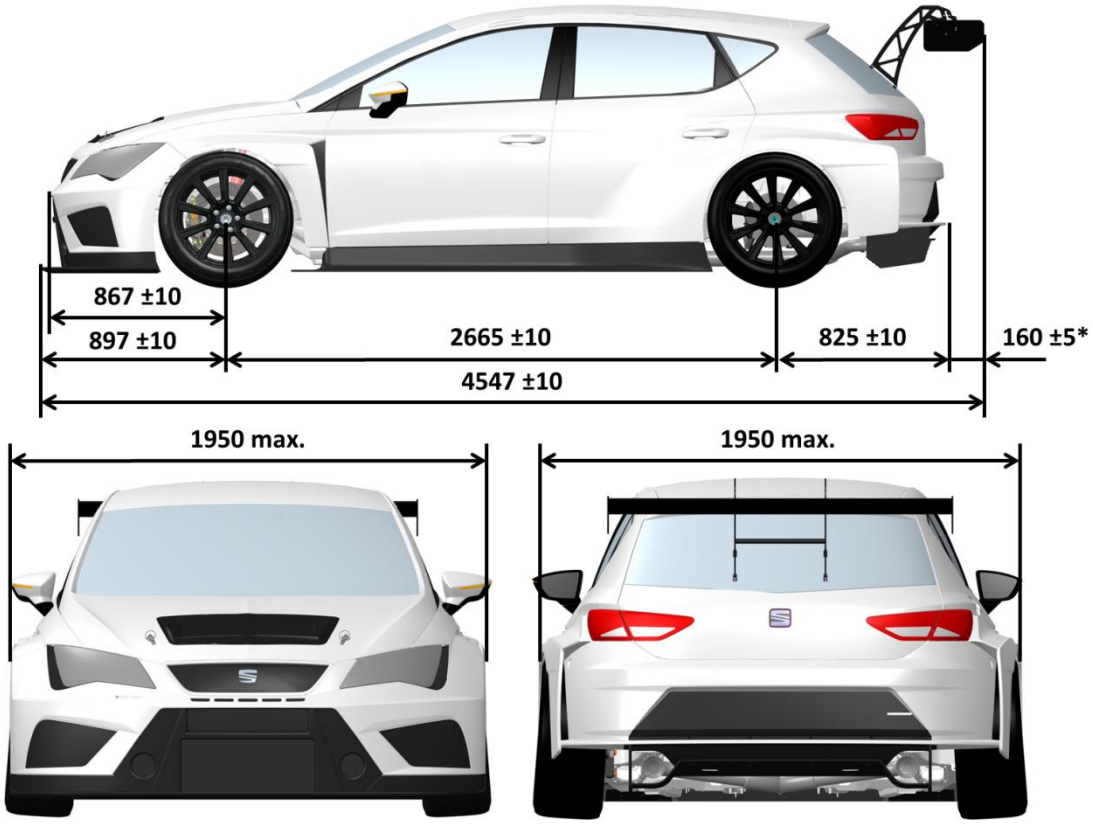
\ Roll-cage	FIA homologated
\ Weight	1.150 kg
\ Front width (max)	1.950 mm
\ Rear width (max)	1.950 mm
\ Length	4.547 mm
\ Wheel base	2.665 mm

Car check-control

\ Acquisition system	AIM - MXG 60 channels
\ Diagnostics	Auto-diagnosis OBDII / DiagRA – LE
\ Airjack	Complete car kit
\ Firer extinguishing system	OMP CESAL 2

1.2 Dimensions and weight

Dimensions	Measurements	Remarks
Overall length	4547 mm	
Overall bodywork front width	1950 mm	
Overall bodywork rear width	1950 mm	
Wheel base	2665 mm	
Over hang front splitter	897 mm	
Over hang front bumper	867 mm	
Over hang rear	825 mm	
Over hang rear wing	160 mm	From the wing to the bumper
Minimum ground clearance	-	80 mm according to TCR regulations



Weight	Measurements
Total weight in race conditions without fuel	1150 kg **
Car balance	60,5% front / 39,5% rear
Distribution weight/power	3,48 kg/HP

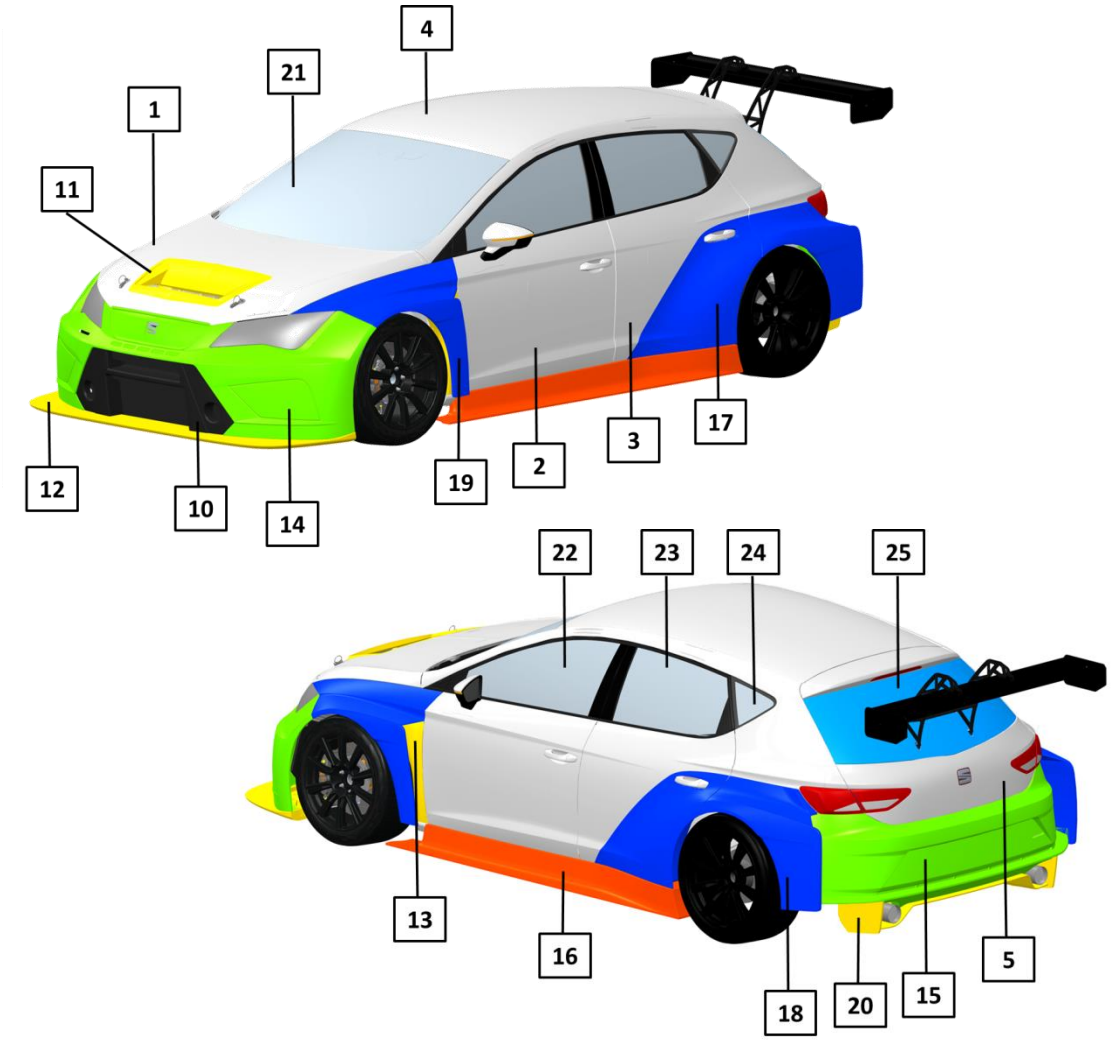
Notes:

* Measured from the rear bumper to the end of rear wing profile.

** The scrutineering dimensions and minimum weight are the ones on the SEAT Leon Cup Racer TCR Technical Form.

1.3 Body-shell

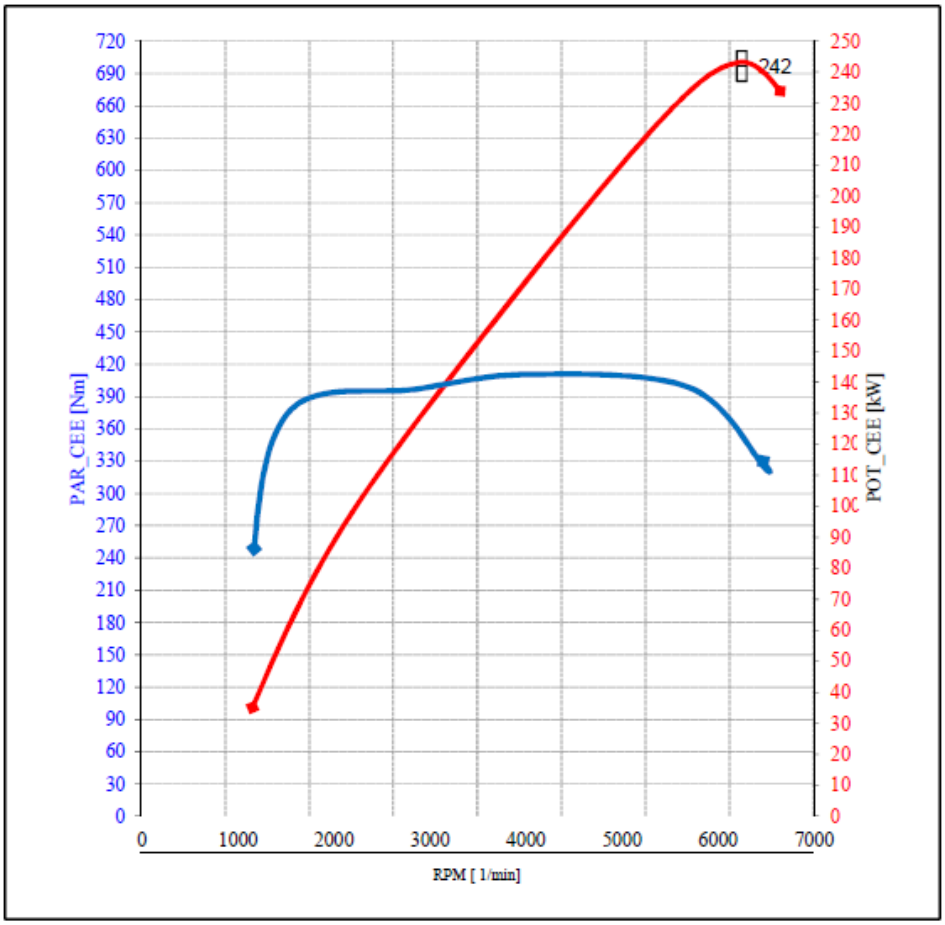
Part number	Description	Material
01	Bonnet	Steel
02	Left / right front door	Steel
03	Left / right rear door	Steel
04	Roof	Steel
05	Boot lid	Steel
10	Bumper air duct	Plastic
11	Bonnet opening	Carbon
12	Front splitter	Carbon
13	Fender air exit	Carbon
14	Front bumper	Fiberglass
15	Rear bumper	Fiberglass
16	Left / right side trim	Carbon, Kevlar & Fiberglass
17	Left / right rear door extension	Carbon (painted)
18	Left / right rear fender extension	Carbon (painted)
19	Left / right front fender	Carbon (painted)
20	Diffuser	Carbon
21	Windscreen	Glass
22	Left / right front door window	Glass
23	Left / right rear door window	Glass
24	Left / right rear triangle window	Plastic
25	Rear window	Plastic



1.4 Powertrain

Engine features	Description
Type	2,0 TSI / Turbocharged & direct injection
Engine identification	CJX
Cylinder capacity	1984 cm^3
Corrected cylinder capacity	1984x1,7 = 3372,8 cm^3
Maximum power	242 kW (330 HP) at 6250 rpm
Maximum torque	410 Nm at 2000 to 5000 rpm
Maximum rpm	6800 rpm
Specific power	165 HP/l
Electronic control unit	CONTINENTAL SIMOS 18.1
Fuel	RON MIN 98 / RON MAX 102
Fuel consumption	0,37 to 0,42 l/km
Exhaust / dB	Twin-end racing catalysed FIA Homologated / 114 dB
Distribution	Chain (sealed)
Oil system	Wet sump
Water pump	One electric water pump + two auxiliary pumps
Water thermostat	Double electronic thermostat
Fan range	Operating range 92°C to 87°C

Engine power and torque curve:

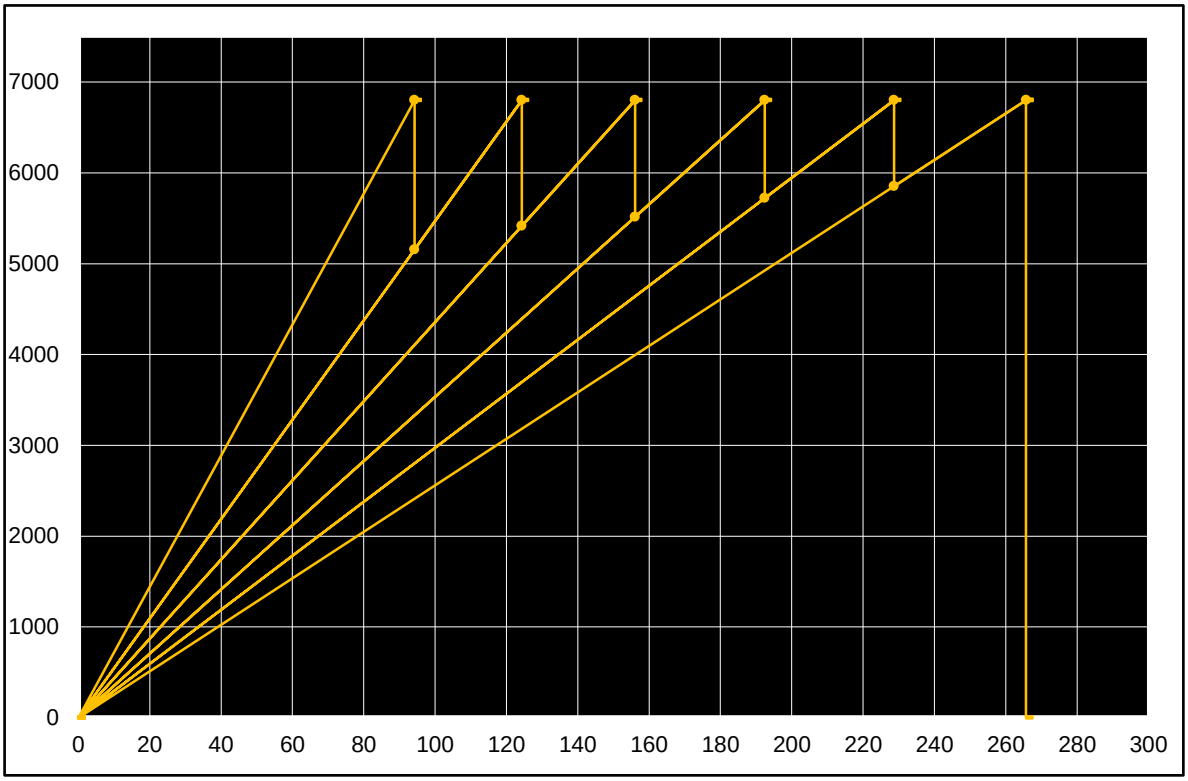


Fuel tank features	Description
Fuel tank type	FIA FT3 homologated fuel tank
Capacity	104 l ±2%
Minimum fuel level before engine fault	Less than 1 litre
Ventilation valve	FIA homologated roll-over, ventilation and 200 mbar pressure regulator valve
Refuelling	Safety FIA plug

Gearbox features	Description
Transmission	Front-wheel drive
Gearbox	6 speed sequential
Differential	LSD with external preload adjustment
Clutch	2 plate cerametallic race clutch
Shift control	Paddle-shift on steering wheel
Gearbox electronic control unit	GCU placed on EM-Box
Gearbox actuator	Monobloc electromagnetic actuator
Cooling system	Gearbox oil radiator
Downshift over-rev protection	Electronically activated

Gear ratios								
Final drive	15	57	0,263					
GEAR	**Z1**	**Z2**	**Gear relation**	**Total relation**	**RPM 3000**	**GEAR SHIFT 6500**	**CUT 6800**	**DIF RPM**
1	12	28	0,429	0,113	42	90	94	
2	13	23	0,565	0,149	55	119	124	1644
3	22	31	0,710	0,187	69	149	156	1384
4	21	24	0,875	0,230	85	184	192	1285
5	26	25	1,040	0,274	101	219	229	1079
6	29	24	1,208	0,318	117	254	266	947

Gear ratios:



Suspension features	Description	Remarks
Front damper Bilstein	2 way adjustable / Aluminium body	Clicks: 10 bump / 10 rebound
Eibach springs front and rear	160/60/70-80-90-100-110-120	Adjustable
Front antiroll-bar	22x2 // 22x3	Adjustable in 6 positions
Rear bumper Bilstein	2 way adjustable / Aluminium body	Clicks: 10 bump / 10 rebound
Rear antiroll-bar	22x3 // 22x4	Adjustable in 6 positions
Front and rear tenders	75/60/2	

Brake features	Description	Remarks
Front calliper	AP Racing Monobloc 6 pistons	Special: SEAT Sport
Front disc	378x34	Special: SEAT Sport
Front pump	AP Racing 19,1 mm	
Front pads	Pagid 5F6 (RST03)	Orange // Thick: 25 mm
Rear calliper	AP Racing 2 pistons	
Rear disc	272x10	Solid
Rear pump	AP Racing 22,2 mm	
Rear pads	Pagid 5F6 (RS 4-4)	Orange
Rear press reducer	Pressure limiting valve 25 bar	
Rear press reducer (power part)	AP Racing 7 position lever	Not standard
Brake balance	Mechanical	

Hand brake features	Description	Remarks
Hand brake	Hydraulic with mechanical locking	Acting on rear axle
Brake pump	AP Racing 15 mm	
Connection type	In series with rear brake line	

1.5 Wheels

Wheel features	Description
Rim dimension	10”x18” ET 36
Rim centre lock	5 studs x 112 mm
Maximum tyre dimension recommended	270/660 R18
Tyre temp difference inside/outside	20ºC
Minimum cold pressure recommended	1.4 bar

1.6 Electronic units

Electronic modules	Remarks	Software	Place
ECU	Continental	Motorsport	Engine bay
GCU	Skynam	Motorsport	Engine bay (EM-Box)
Gearbox actuator	XAP	Motorsport	Engine bay
Low fuel pump control	PWM control module	Series	Roll-cage
Fuel level display	SEAT Sport	Motorsport	Cockpit
Electronic steering rack	VW	Motorsport	Front subframe
ABS/ESP unit	Continental	Not active	Cockpit
Gateway	VW	Series adapted	Cockpit
Black box	Audi	Motorsport	Cockpit
MXG display/logger	AIM	Motorsport	Cockpit
Fuse box	SEAT Sport	Motorsport	Cockpit
Steering driver module	SEAT Sport	Motorsport	Cockpit
Transponder			Engine bay

Modules based in series					
	Engine ECU	**Low fuel pump**	**Steering rack**	**ABS/ESP**	**Gateway**
Specific software/mapping:	Yes	No	Yes	No	Yes
Specific codifications:	Yes	No	Yes	Yes	Yes
Interchangeable between cars:	Yes	Yes	Yes	Yes	Yes
Spare part ready for plug and play:	Yes	Yes	Yes	Yes	Yes
Modification allowed:	No	No	No	No	No

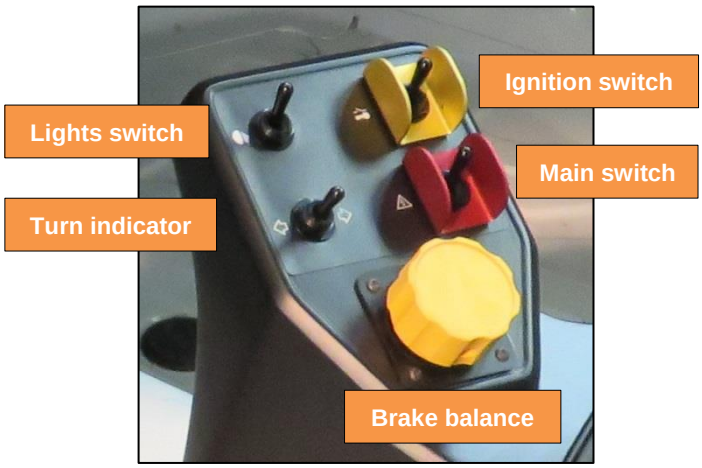
Notes:

- Use always spare parts from SEAT Sport. Although the mentioned parts derive from series cars, the software and codifications are different and modified by SEAT Sport.
- All series modules used on the car are based in the MQB platform. Through the diagnostic tools available on the VW Group dealers, it is possible to diagnostic any malfunction.

2 DRIVER CONTROL

In this section, it is explained how the driver can handle the different commands and functions of the car.

2.1 Main panel



Function	Remarks
Ignition switch:	It activates the power to all devices. The Main Switch has to be active.
Main switch:	It activates the power supply.
Lights switch:	It activates the low beam. High beam and flash activation buttons are placed on the steering wheel module.
Turn indicator:	It activates the left and right turn lights. A green alarm on the display appears showing that the turn light is blinking.
Brake balance:	Turning the balance wheel you can balance the brake pressure from front to back or vice versa. Do not press the brake pedal while moving the balance wheel. Through the driver display you can check the front and rear brake pressure and the balance in percentage.

Notes:

- To start the car, always proceed in this order: Main switch and later ignition switch.
- The correct procedure to stop the car is the following:
  1. Stop the engine using only the yellow switch (ignition switch/KL-15).
  2. Wait at least 60 seconds. If the waiting time is lower, the OBD faults memory is not saved.
  3. Switch off the car using the red switch (main switch/KL-30).
- If this procedure is followed correctly the OBD faults memory is saved and these faults can be checked with the diagnostics tools at any time thereafter. These faults are saved until the memory is deleted manually using the diagnostics program.

The diagnostics tool DiagRA-LE is recommended for customers to be able to check the cars.

2.2 Steering wheel module

The electronic steering wheel module permits activating different functions without removing hands from the steering wheel.
Some buttons have double functionality.

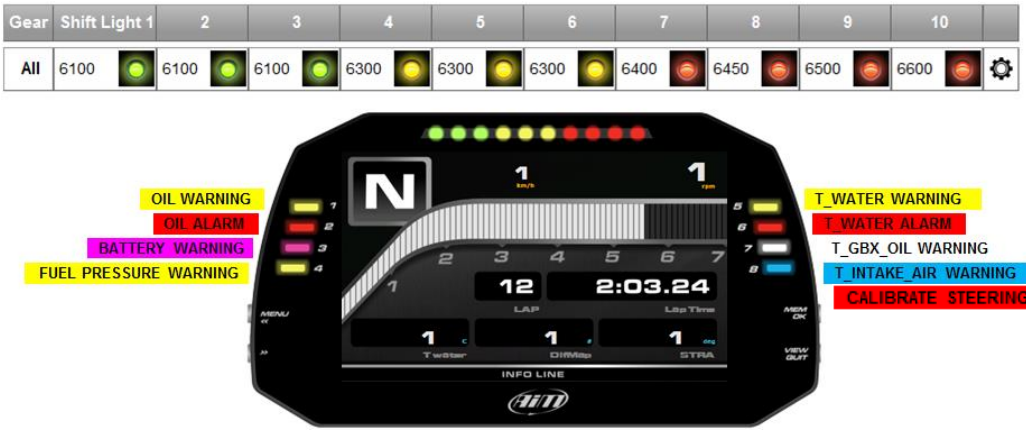
Button	Function	Remarks
	**Starter**	Active if gearbox is in Neutral position Active if rpm < 500
	Speed limiter / Virtual Safety Car	Active if rpm > 500 Short push to activate/deactivate
	**Limited speed value (Speed limiter / VSC)**	Short push to scroll limited speed value Selected speed value is shown on the display 5 limited speeds: 40, 60, 80, 100 and 120 km/h
	**Safety brake signal button**	Allows entering to and exiting from N without pressing the clutch pedal **IMPORTANT:** the use of this button is under user responsibility, a bad use of it may cause fatal damages on the gearbox
	**Radio**	Driver voice activation Maintain pushed to talk
	**Rain lights**	Short push to activate/deactivate
	**Cockpit fan**	Short push to activate/deactivate
	**Change display**	Short push to change display page / rolling change
	**High beam**	Short push to flash Long push to activate/deactivate
	**Wiper**	Short push to activate/deactivate
	**Windscreen water**	Push to activate water splash + wiper activation
	**Drink**	Activates water pump Note: pump not supplied with the car
− +	**Tip up / Tip down**	A led informs when tip up or down paddle has been pressed
	**CAN info**	Usual status: led off If there is a CAN Bus problem: led on

Note:

- Although it is possible to uncouple completely the steering wheel from the column with the engine running, it is not advisable (causes fault messages on the OBD).

2.3 Display alarms and shift lights

Car delivery alarm configuration:



- **LED 1 yellow alarm light**: Low oil pressure. If no red alarm follows you can continue. If alarm disappears you can continue pushing. Check the oil level when back into the pit.
- **LED 2 red alarm light + POP UP**: Very low oil pressure. Big risk to break the turbo or to damage the engine. Seat Sport recommends slowing down and entering to the pit-lane or stopping in a safe place.
- **LED 3 purple alarm light**: Battery voltage low warning. You can continue, check the alternator and the alternator poly-V belt.

- **LED 4 yellow alarm light**: Fuel pressure low warning. You can continue, check the fuel level.
- **LED 5 yellow alarm light**: water temperature high. Pay attention, drive out of slipstream and keep an eye on the values. If no red alarm follows you can continue. If alarm disappears you can continue pushing.
- **LED 6 red alarm light**: water temperature too high. Drive out of slipstream and keep an eye on the values. Some torque reductions will appear but you can continue.
- **LED 6 red alarm + POP-UP message**: Critical water temperature. Seat Sport recommends slowing down and entering to the pit-lane or stopping in a safe place, to avoid damaging the engine.
- **LED 7 white alarm light**: Gearbox oil temperature high. Drive out of slipstream and keep an eye on the values if not some torque reductions will appear. You can continue.
- **LED 8 blue alarm light**: Intake air temperature high. Drive out of slipstream and keep an eye on the values if not some torque reductions will appear. You can continue.
- **LED 8 red alarm light**: Steering initialization needed (it will appear each time the car is switched on). Turning the steering wheel left and right should disappear. If not, there is a problem in the electrical steering rack.

	Events	Alarms			
priority	ALRM Oil_Pressure 2	LED: 2	Output:	Message:	
	ALARM Oil_Pressure	LED: 1	Output:	Message: Low Oil Pressure	
	Oil Pressure_Popup	LED:	Output:	Popup Message: OIL PRESSURE	
	ALARM Fuel_Pressure	LED: 4	Output:	Message: FUEL PRESSURE LOW	
	WATER TEMP POPUP	LED:	Output:	Popup Message: CRITICAL WAT	
	ALARM T_Water_2	LED: 6	Output:	Message: WATER TEMP TOO H	
	ALARM T_Water	LED: 5	Output:	Message: WATER TEMP HIGH	
	ALARM Gearbox_Temp	LED: 7	Output:	Message: GEARBOX TEMP HIGH	
	ALARM Air Temp	LED: 8	Output:	Message: AIR TEMPERATURE H	
	ALARM Battery	LED: 3	Output:	Message: Bat Voltage Low	
	Steering Wheel pos	LED: 8	Output:	Message: Steering Wheel Pos	

2.4 Gearbox functioning

R - Reverse mode:

- It is possible to put on this R mode if the car is complete stopped and clutch pedal pressed.
- In case of clutch pressure sensor malfunction, it is also possible to use the steering wheel (P) Safety brake signal button to put on or take out the R mode. **IMPORTANT:** the use of this button is under user responsibility, a bad use of it may cause fatal damages on the gearbox.

N - Neutral mode:

- In N mode, it is possible to move the car pushing externally (pit lane use).
- To enter into this mode it is mandatory to press the clutch pedal.
- To exit from this mode it is necessary to be completely stopped and pressing the clutch pedal.
- It is also possible entering to and exiting from this mode using the steering wheel (P) Safety brake signal button. **IMPORTANT:** the use of this button is under user responsibility, a bad use of it may cause fatal damages on the gearbox.

D - Driving mode:

- It is possible to go from N to 1st gear if the car is completely stopped and the clutch pedal is pressed. Also possible using the steering wheel (P) Safety brake signal button. **IMPORTANT:** the use of this button is under user responsibility, a bad use of it may cause fatal damages on the gearbox.
- It is possible to put on Neutral mode at any moment only if the clutch pedal is pressed.
- It is not necessary to use the clutch while shifting on the track, only to start from standing position.
- Once the vehicle is moving use the steering wheel paddle-shift to upshift or downshift.
- The shifting is manual. When the engine reaches rpm limit (6800 rpm) the power is limited and to stop the car is necessary to press the clutch pedal to avoid engine stalling.
- Downshifting is protected preventing the engine from over-revs. If there is a down-shift demand at too high revs the gearbox will not do it.

Parking mode:

- Use the Neutral gearbox mode and lock manually the hand brake using the locking hook. The gearbox will not be locked, only the car due to the rear brake pressure generated by the hand brake pump.
- To unlock the car just remove the hand brake hook.
- To lock the transmission completely, stop the car on 1st or R gear.

2.5 Standing start procedure

Start rev limiter:

This system is automatically and only activated if wheels are absolutely stopped. The throttle pedal can be fully pressed and engine speed will be limited at 4200 rpm until the car starts moving.

There are many ways to manage standing starts; following the SEAT Sport recommendation is explained.

Process:

1. After the grid formation lap, stop completely the car on the grid line pushing clutch and brake pedals.
2. 1st gear has to be engaged.
3. Use the hand brake to keep the car stopped and release the brake pedal.
4. When the red starting lights begin, maintaining the clutch pedal fully pressed, push gas pedal flat out. Engine will limit at 4200 rpm.
5. Preload the car releasing the clutch slowly while you keep the car stopped with the hand brake.
6. When the red light turns off, release the hand brake and control the start with clutch and throttle pedals. Once the car starts moving the rev limiter will disappear so be careful to avoid engine stall and wheel spin.

Notes:

- Is possible to start at lower engine speed without using the start rev limiter, just get the desired engine speed playing with the throttle pedal. Advisable no bellow of 3500 rpm.

- Take care of the time you are keeping the engine preloaded at 4200 rpm. The clutch and the engine may take temperature very fast. Recommendation no more than 6 seconds of start rev limiter use.

2.6 Speed limiter (Virtual Safety Car)

The speed limiter system allows limiting the car speed at a predefined value. There are five possibilities: 40, 60, 80, 100 and 120 km/h. This system is recommended for the pit lane area or Virtual Safety Car (VSC) situations.

Process:

1. Select the speed using the green button on the steering wheel. The is shown on the display.
2. Make a short push on the red starter button on the steering wheel to activate the function at the previously defined speed. From this moment on throttle pedal may be fully pressed and the speed will be limited.
3. If the car speed is over the target, the engine torque may be cut. If the speed is below the target, torque will be applied till the speed is reached.
4. Make a short push on the red starter button on the steering wheel to deactivate the function.

Note:

- It can be applied in different gears.

2.7 Driver has to consider

- Learning and memorizing the steering wheel buttons placements and functions will allow drivers a faster action and will help them to keep focused on the track.
- Warm up the engine before starting. The minimum water temperature recommended before loading the engine is 80°C.
- Check the brake pedal stiffness when car is stopped or on the acceleration way.
- Warm up tyres before attacking. Without blankets use, the rear tyres may need 2 laps to get warm and the car is very sensitive to this.
- Shift up gears when shift light indicates. The shifting lights have been optimized taking into account gear ratios and engine power.
- Shift down gears without stress. If a downshift is required at too high revs it will be electronically rejected at it will not happen.
- In-laps: cool down brakes and engine water to avoid thermal shocks.
- There are three different possibilities to show alarms on the display: lateral leds, messages on a red ribbon in the lower part of the screen and complete screen pop-up messages. If a pop-up message appears is strongly recommended to stop the car.
- If for any reason it is necessary to drop out the car on the track, leave the gearbox in neutral to save the transmission in case of being towed.
- It is important to bed discs as follows to get their maximum life:
    - When possible bed discs with used pads.
    - To reduce thermal shock during bedding, the brake ducts may be 50% taped off.
    - Apply the brakes gently at low speed a few times to ensure a correct installation.
    - Apply the brakes moderately, (progressively up to 50% race speed, 25% race pressure), for 10-20 applications to ensure above 80% pads face contact with disc. The contact with the disc face is particularly important at the inner swept area. The first time a driver gets used to bedding discs on a car it is worthwhile getting him to return to the pits to check contact is sufficient before preceding to the next step.
    - Progressively build up to about 70% of race speed and 50% of race pressure. Then, apply brakes for approximately 25 applications.
    - Perform one lap cooling down before returning to the pits.
    - When returning to the track, come up progressively to race speed and pressure.

3 ELECTRONICS

3.1 AIM MXG

MXG is the AIM dash-logger designed to acquire and display data coming from your ECU, the internal accelerometer and gyro, as well as from the GPS module, analog/digital inputs and predefined math channels.
Performance and data acquired can also be incremented adding expansion modules.

To enable “the lap time” is necessary to insert the track where you are running. Track load has to be done by the program GPS Manager available at the RaceStudio3 software.

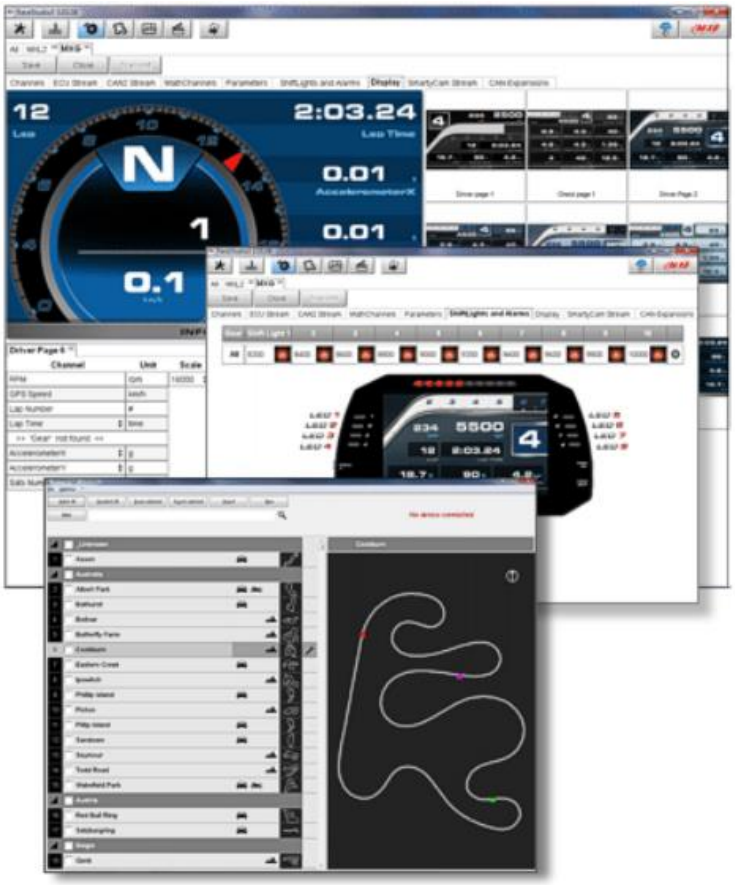
SmartyCam: The on-board camera that overlays on videos the data sampled by your logger.

RaceStudio3 software, latest MXG firmware and documentation available on AIM website:

http://www.aim-sportline.com/eng/download/index.htm

MXG user guide available on AIM website:

http://www.aim-sportline.com/download/doc/eng/mxs-mxg/MXG_user_guide_101.pdf



Shift lights and alarms:

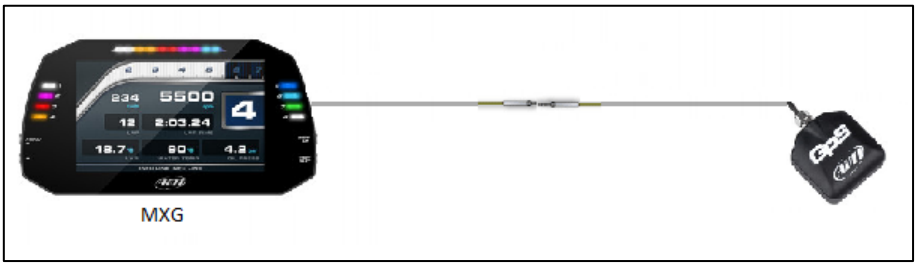
1. On the top of the display there are ten gear flash leds that can be freely configured. The rpm value at which to turn it on and the colour can be defined. Gear dependent lights can be also defined.
2. On both sides of the screen there are eight alarm leds that can be freely configured. The conditions to turn them on and off and the colour can be defined. Also messages on a red ribbon in the lower part of the screen and completely screen pop-up messages can be defined.

Notes:

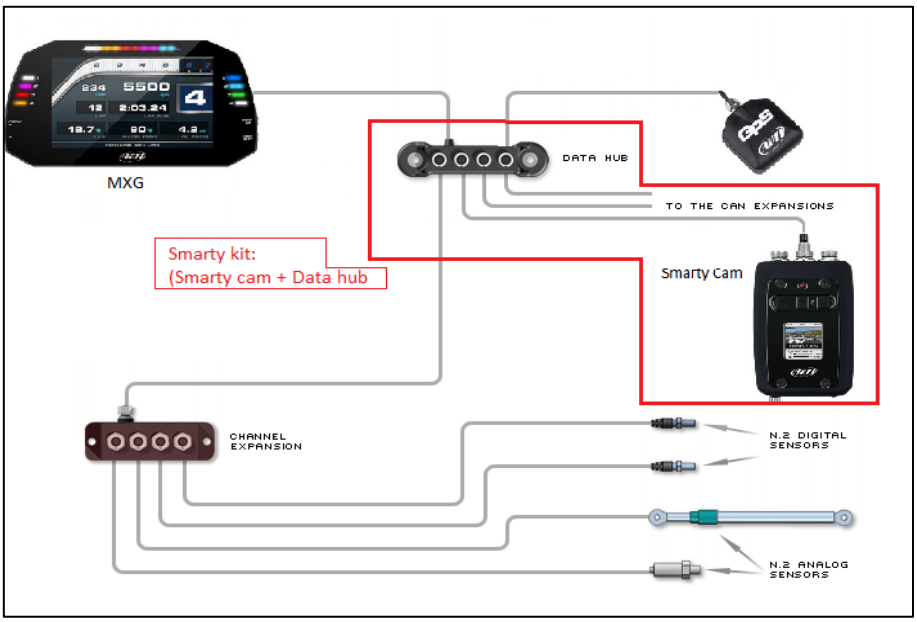
- **IMPORTANT:** the change of the alarms or shift lights is under user responsibility.

3.2 MXG connection schemes

Scheme 1: Data-logger standard connection scheme (car delivery).



Scheme 2: Data-logger connection scheme with Smarty-cam and expansion module.



Features	Remarks
Lap-trigger	The MXG system uses only GPS signal.
Circuit	Through the RaceStudio3 software is possible to activate all the circuits in the world. It is also possible to create and load a new circuit.
Extra sensors	In case of adding extra sensors, they have to be connected to an expansion module. This expansion module has to be connected through the data hub as shown in the scheme 2.

Notes:

- Channel expansion module and sensors are available through AIM dealers, not SEAT Sport.
- If for any reason it is necessary to send data acquisition files to SEAT Sport, following data file extensions must be sent: .drk, .bak, .gpk, .rrk and .xrk.

3.3 Data acquisition

AIM-MXG channel list:

Channel name	Description	Unit	Recommended scale
P_TURBO	Boost pressure	bar	0 ... 3
T_ENG_AIR	Intake air temperature	°C	20 ... 70
T_ENG_OIL	Engine oil temperature	°C	80 ... 150
T_ENG_WATER	Engine coolant temperature	°C	70 ... 125
T_AIR	External air temperature	°C	12 ... 45
RPM_ENG	Engine speed	rpm	1000 … 7000
FLAG_BRAKE	Brake lights	on/off	0 … 2
P_BRK_FRONT	Front brake pressure	bar	0 … 100
P_BRK_REAR	Rear brake pressure	bar	0 … 100
P_ENG_OIL	Engine oil pressure	bar	1,5 … 5
P_ENG_FUEL	Fuel low pressure	bar	0 … 7
FUEL_LEVEL	Fuel level	l	0 … 110
FUEL_CONS	Fuel consumed	l	0 … 110
S_FUEL	Fuel remaining time	l	0 … 120
N_FUEL	Fuel remaining laps	#	0 … 80
LAP_CONS	Fuel lap consumption	l /lap	0 … 3
POS_PEDAL	Gas pedal position	%	0 … 100
TIP_DOWN	Tip down	Sign	0 … 2
TIP_UP	Tip up	Sign	0 … 2
G_CH_Y	Lateral acceleration	G	-2,5 … 2,5
G_CH_X	Longitudinal acceleration	G	-1,6 … 1,6
W_CH	Yaw rate	°/s	-50 … 50
V_WHL_RL	RL wheel speed	km/h	0 … 260
V_WHL_RR	RR wheel speed	km/h	0 … 260
V_WHL_FL	FL wheel speed	km/h	0 … 260
V_WHL_FR	FR wheel speed	km/h	0 … 260
V_WHL_REF	ESP reference speed	km/h	0 … 260
A_STE	Steering angle	°	-200 … 200
V_STW_LIMIT	Speed limit value	km/h	40 … 120
FLAG_STW_OUT1	Steering wheel button state	#	0 … 8
FLAG_STW_OUT2	Steering wheel button state	#	0 … 8
FLAG_STW_OUT3	Steering wheel button state	#	0 … 8
FLAG_FBX_RELAY1	Fusebox relay 1 state	#	0 … 8
FLAG_FBX_RELAY2	Fusebox relay 2 state	#	0 … 8
FLAG_FBX_F5	Fuse state 5	#	0 … 8
FLAG_FBX_F4	Fuse state 4	#	0 … 8
FLAG_FBX_F3	Fuse state 3	#	0 … 8
FLAG_FBX_F2	Fuse state 2	#	0 … 8
FLAG_FBX_F1	Fuse state 1	#	0 … 8
I_FBX_MAIN	Main current	A	10 … 40
I_FBX_TURNLIGHT	Turnlight current	A	0 … 10

External Voltage	Battery Voltage	V	8 … 15
P_GCU_CLUTCH	Clutch pressure	bar	0 … 100
POS_GCU_GEAR	Gear	#	-1 … 7
T_GCU_OIL	Gearbox oil temperature	º	80 … 150
U_GCU_GEAR	Gearbox potentiometer	mV	0 … 5000
POS_XAP_POT	Actuator position	#	0 … 32767
POS_XAP_POT_FILT	Actuator position filtered	#	0 … 32767
U_XAP_BAT	Actuator power supply	V	8 … 15
I_XAP_OUT	Actuator output current	A	0 … 120

GPS channels	Description	Unit
GPS_Speed	Speed	km/h
GPS_Nsat	Nº of satellites	#
GPS_LatACC	Lateral acceleration	G
GPS_LonACC	Longitudinal acceleration	G
GPS_Slope		º
GPS_Heading		º
GPS_Gyro		º/s
GPS_Altitude		m

The values shown in the following table are the standard approximate values at 20°C air temperature for main car control channels.

Channel	Idle speed*	Values at T_air 20°C	Maximum value**
P_TURBO	0 bar	2.35 bar	2.99 bar
P_ENG_FUEL	4.1 bar	4.3 bar	6 bar
P_ENG_OIL	2 bar	3.6 bar	5 bar
T_ENG_AIR	40ºC	42°C	>75°C
T_ENG_OIL	80ºC	122°C	>145ºC
T_ENG_WATER	90ºC	92°C	>115°C
T_GCU_OIL	40ºC	110°C	>145°C

Notes:

* These values can change depending on car's engine temperature. Those are approximate values when T_ENG_WATER is 90ºC after having warmed the car from cold always at idle speed.

** The maximum value underlined in orange shows the value before performance restrictions or protection modes are applied.

3.4 Fusebox

The fusebox is an electronic box that controls the power supply to practically all devices. Internally, the thermal fuses reset automatically, so changing a fuse will never be necessary. In case of malfunction it has to be sent to SEAT Sport.
It is also possible to check if a fuse has blown in the fusebox, so you will know if the current or signal was sent.

There are three ways to check the correct functioning:

- Live measures view in RaceStudio3.
- Checking the fusebox control channels in Race Studio Analysis.
- Checking the red LEDs on the fusebox.

If a malfunction is detected, it is necessary to control the corresponding wiring or the device.

Fuse box LED label

In the following table is shown the fuse analysis information:

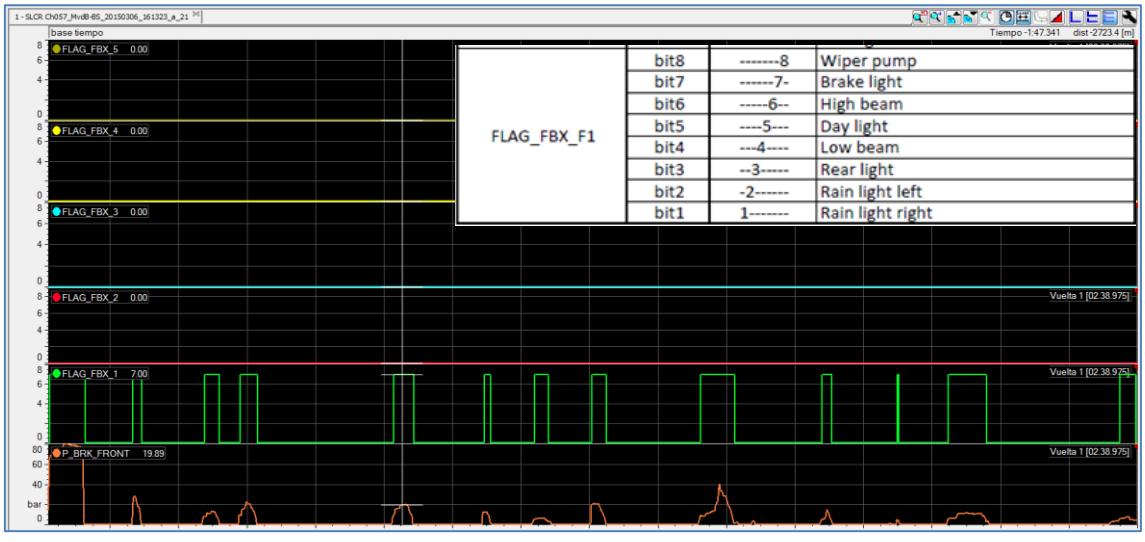
- Channel name: There are 5 channels to analyse.
- Bit number: Each channel is able to control 8 fuses.
- Data value: Is the value you can check on data acquisition.

Channel name	Bit number	Data value	Description
FLAG_FBX_F5	bit8	-------8	Sadev pump
	bit7	------7-	HR-ECU
	bit6	-----6--	HR-Fuel pump
	bit5	----5---	Starter
	bit4	---4----	Radio
	bit3	--3-----	HR-Lambda
	bit2	-2------	HR-Miscellaneous
	bit1	1-------	HR-Injectors
FLAG_FBX_F4	bit8	-------8	MR-ignition coils
	bit7	------7-	Sadev-ELV
	bit6	-----6--	Drink
	bit5	----5---	Switch Panel / Aux. Data connector
	bit4	---4----	Steering Wheel

	bit3	--3-----	Gear Lever / GCU
	bit2	-2------	Diagnosis Connector
	bit1	1-------	Power steering ECU
FLAG_FBX_F3	bit8	-------8	ECU
	bit7	------7-	Front Fan
	bit6	-----6--	MXG
	bit5	----5---	Blackbox / Gateway
	bit4	---4----	Differential
	bit3	--3-----	+30 Aux. connector
	bit2	-2------	DSG
	bit1	1-------	ABS ELV
FLAG_FBX_F2	bit8	-------8	Wiper
	bit7	------7-	Turn light
	bit6	-----6--	Diagnosis Connector / +15 Aux con.
	bit5	----5---	Cockpit fan
	bit4	---4----	Window
	bit3	--3-----	not used
	bit2	-2------	Transponder
	bit1	1-------	+15 signal
FLAG_FBX_F1	bit8	-------8	Wiper pump
	bit7	------7-	Brake light
	bit6	-----6--	High beam
	bit5	----5---	Day light
	bit4	---4----	Low beam
	bit3	--3-----	Rear light
	bit2	-2------	Rain light left
	bit1	1-------	Rain light right

Example:

- In the acquisition screenshot bellow is shown the channel “FLAG_FBX_1” in green. The value is “7” when braking and 0 when no braking. In this case, the conclusion is that there is a problem on the brake light line.



3.5 Fuel level display

All new SEAT Leon TCR cars have a fuel display to control the fuel remaining at the tank. It is tied to the roll cage in the rear right door area. The display has to be set after each refuelling. This setting is very important to get the correct fuel level because it is calculated by the fuel consumption sent from the engine ECU.

- There is a light sensor for automatic brightness trimming.
- Two sensitive zones below the four digits allow menu navigation.
- It is important not to touch the front panel when it is switching on due to the initial capacitance setting during start up.
- Also take special care wiping with hand the front panel if device is switched on.
- Electrostatics charge could affect the sensitive touch and set undesired actions.

Terminology:

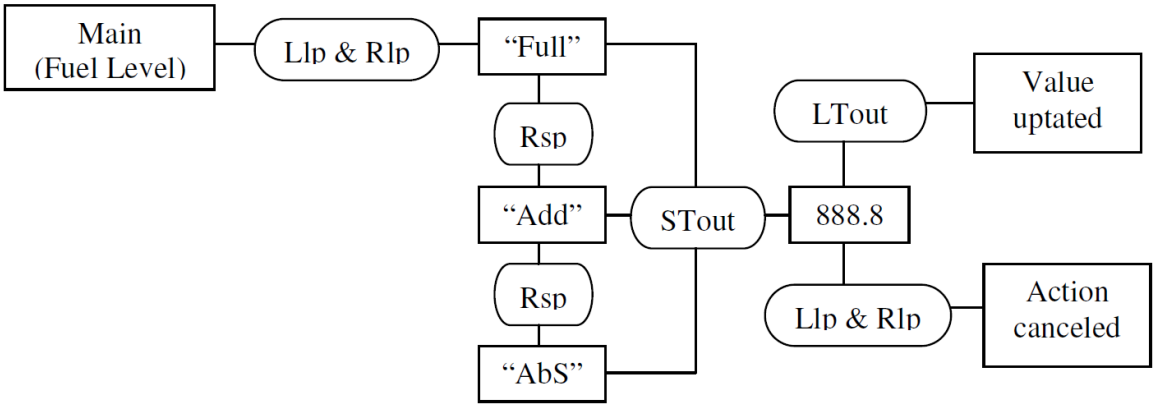
Following, the terminology description to understand future command tables:

- **Llp:** Left long push (>1s)
- **Rlp:** Right long push (>1s)
- **Lsp:** Left short push (<1s)
- **Rsp:** Right short push (<1s)
- **STout:** Short Timeout (1s)
- **LTout:** Long Timeout (8s)

Fuel level adjustment:

This menu allows the following possibilities:

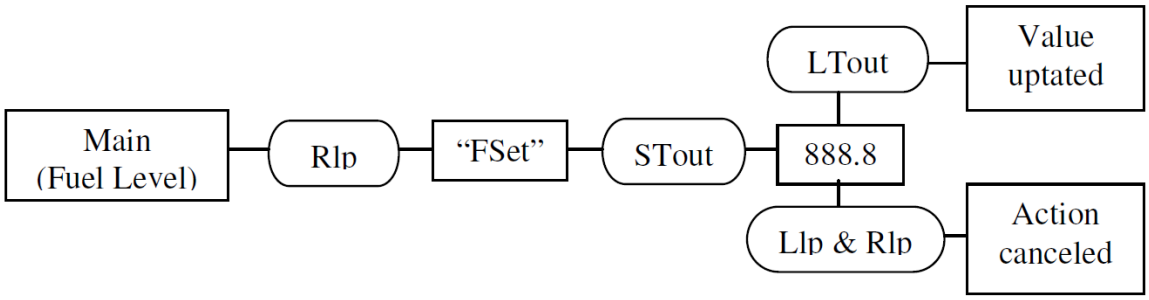
- Set fuel level to full tank value.
- Add/remove a fuel quantity to the actual value.
- Set an absolute quantity (litres without decimal).



- When the value is shown (and blinking), a right short push increases this value litre by litre and a left short push decreases this value.
- Maintaining right/left long push, the value is increased/decreased 10 litres by 10 litres.

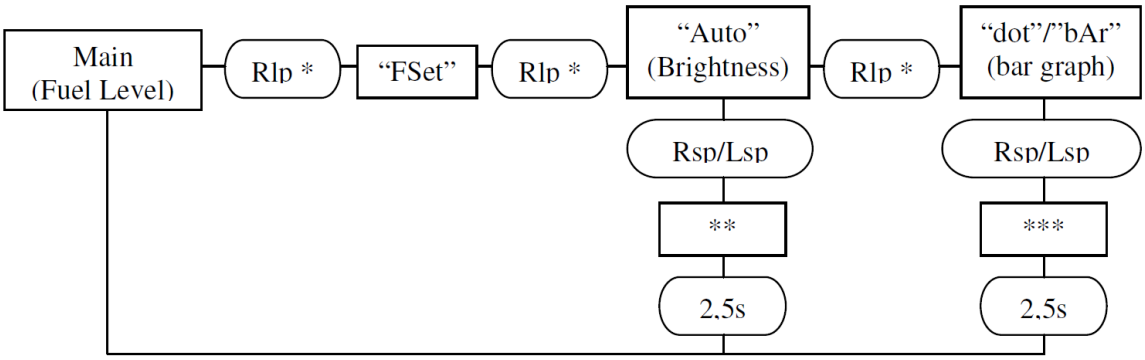
Set Full level value:

This menu allows setting the maximum tank level or predefined fuel level.



Brightness and bar graph set:

It is possible modify the brightness and bar graph settings.



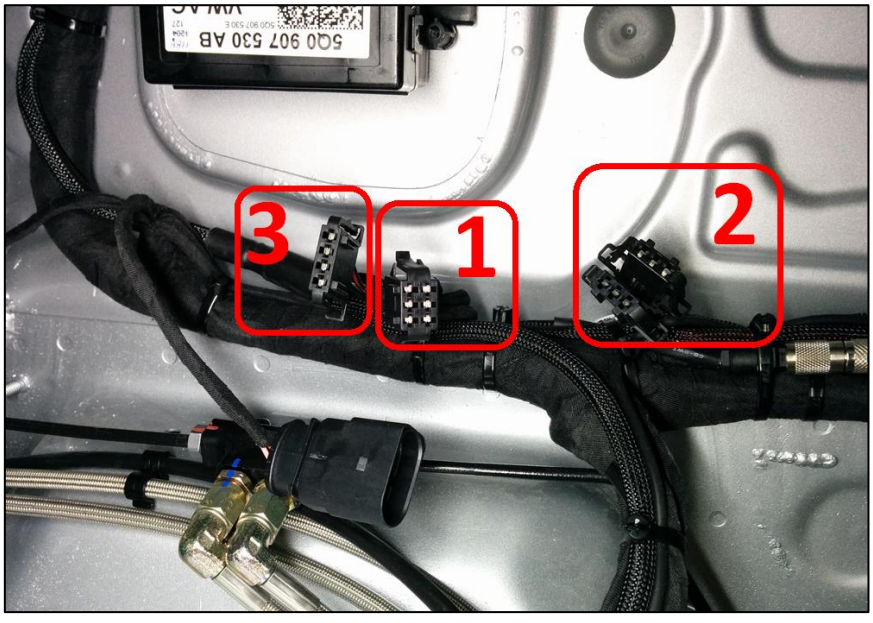
* Long left push will scroll menu on the other side.

** "Auto" will adjust automatically the brightness. Else, use right / left touch to increase / decrease light level.

*** "dot" mode will light on only one led on the bar graph. "bAr" mode will light on all leds beginning from the left side up to the level point. Note that the last led matches with the Full value set.

3.6 Auxiliary connectors

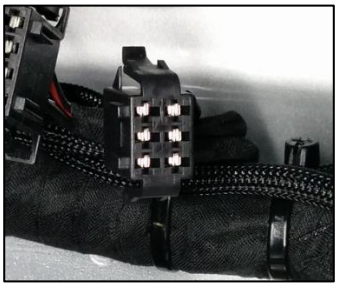
The main car wiring loom is prepared with some auxiliary connectors to make easier the connection of auxiliary devices.



#1: Auxiliary power supply

This connector is placed in the driver cockpit above the central tunnel (front). It could be used for user requirements such as connecting the TCR scrutineering EVO4 logger.

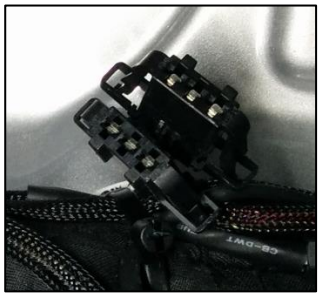
Auxiliary power supply		
Matching connector		191 972 733
Pin-out		**Terminal**
1	+30 up to 8A	FS 2,8 x 0,8 (*)
2	GND	FS 2,8 x 0,8 (*)
3	CAN H traction	FS 2,8 x 0,8 (*)
4	CAN L traction	FS 2,8 x 0,8 (*)
5	CAN H chassis	FS 2,8 x 0,8 (*)
6	CAN L chassis	FS 2,8 x 0,8 (*)



#2: Auxiliary analogic sensors

Two connectors are available connected to the dash logger.

Auxiliary analogic sensors		
Matching connector		191 972 713
Pin-out		**Terminal**
1	5v	FS 2,8 x 0,8 (*)
2	signal	FS 2,8 x 0,8 (*)
3	GND	FS 2,8 x 0,8 (*)



#3: Additional power supply

It can be used for any requirement.

Additional power supply		
Matching connector		1J0 972 714
Pin-out		**Terminal**
1	+30 up to 8A	FS 2,8 x 0,8 (*)
2	+15 up to 5A	FS 2,8 x 0,8 (*)
3	GND	FS 2,8 x 0,8 (*)
4	GND	FS 2,8 x 0,8 (*)

Radio and drink

Behind the driver seat there are two free connectors associated with the steering wheel module. Connecting here the radio and drinking systems, both can be handled through the steering wheel module.

Radio connector		
Matching connector		AMP Super-seal 4-way 282106-1
Pin-out		**Terminal**
1	PTT	183024-1 or 183036-1
2	PTT	183024-1 or 183036-1
3	+30 up to 8A	183024-1 or 183036-1
4	GND	183024-1 or 183036-1

Drink connector		
Matching connector		1J0 973 822
Pin-out		**Terminal**
1	up to 2.5A	
2	GND	

Power supply cut:

There is a connector that gives power supply to the fusebox, so in case of disconnection cuts all devices power supply.

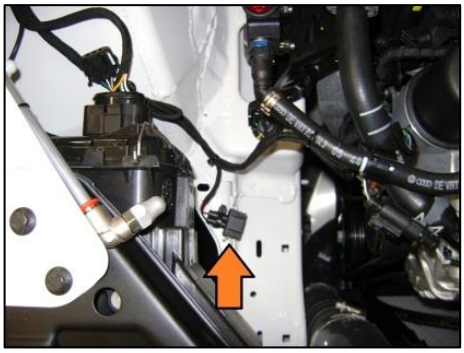
You can unplug it in case of transport or for a most safety disconnection in case of workshop big jobs.

See connector placement close to the fusebox main connectors on the picture beside.

Transponder:

This auxiliary connector is placed next to the right front headlight. All TCR cars are provided without transponder.

Transponder		
Matching connector		357 972 762
Pin-out		**Terminal**
1	12v	FS 2,8 x 0,8
2	GND	FS 2,8 x 0,8



4 SETTING ADJUSTMENTS

4.1 Standard set-up

Leon Cup Racer TCR — **TEST SET-UP** — SEAT SPORT

CAR INFORMATION		TRACK INFORMATION			
Chassis		Circuit		DATE	2016
Engine		Lenght		FROM	
Gearbox		Driver		TO	

CAR CONFIGURATION	FRONT	REAR
*RIDE HEIGHT	80 mm	80 mm
MEASUREMENT POINT	Car's lowest point	Car's lowest point
DAMPERS	**FRONT**	**REAR**
MAIN SPRING	160/60/110	160/60/90
TENDER	75/60/2	75/60/2
ASSEMBLY LENGHT	-	-
UPRIGHT LENGHT	0 mm	-
BUMP STOP	20 mm (5000 N/4 mm)	35 mm (5000 N/4 mm)
BUMP	click 5 (0 - 10)	click 5 (0 - 10)
REBOUND	click 5 (0 - 10)	click 5 (0 - 10)
ANTI-ROLL BARS	**FRONT**	**REAR**
TYPE	22x3	22x3
POSITION	M - M	M - M
WHEELS	**FRONT**	**REAR**
RIM	Fond 18x10J ET36	Fond 18x10J ET36
SPACER	0	0
**TYRES	MICHELIN PILOT SPORT GT S9L 27/65 R18	
HOT TYRE PRESSURE	2,0	2,0
BRAKES	**FRONT**	**REAR**
MASTER CYLINDER	AP Racing 19,1 mm	AP Racing 22,2 mm
BRAKE PADS	PAGID RST 3	PAGID RS 4-4
BRAKE DISCS	AP Racing 378x34	VAG 272x10
PRESSURE RELATION	15/12	25 bar limited
AERO		
WING POSITION	0º	

POWER TRAIN

ENGINE

RPM MAX	6800	Refect
HP	330	319

TRANSMISSION

Gear	Ratio		Vmax
1	12//28	0,113	92,23
2	13//23	0,149	121,64
3	22//31	0,187	152,72
4	21//24	0,230	188,30
5	26//25	0,274	223,81
6	29//24	0,318	260,04
cwp	15//57		

DIFFERENTIAL

RAMPS	60/30
PRELOAD	90 Nm

CLUTCH

MASTER CYLINDER	AP Racing 15,9 mm

HAND BRAKE

MASTER CYLINDER	AP Racing 15 mm

ALIGNEMENT

	FRONT	
	LEFT	RIGHT
CAMBER	4,5º	4,5º
TOE std. ride height	1.0 mm OUT	1.0 mm OUT
	REAR	
CAMBER	4º	4º
TOE std. ride height	0.0 mm	0.0 mm

WEIGHT

DRIVER	75 kg	
FUEL	20 kg	
FRONT		TOTAL
LEFT	RIGHT	
REAR		
FRONT		CROSS
REAR		LEFT

NOTES

Alignement with 75 kg + 20 kg of ballast

Info: minimum ride height on International TCR 2016 regulations.

****Standard delivery tyres: Michelin P2G 27/65 R18 (RAIN) - May be changed due to destination requirements***

Note:

- This is also the car delivery set-up. Due to production issues, small changes on this set-up sheet may occur. Seat Sport recommends doing your own check.

4.2 Steering rack centering

As the steering rack is electric, the steering angle sensor has to be electronically aligned with the wheels at the aligning time.

How to proceed to align the steering angle sensor:

It is necessary fix the steering wheel. To do it, you can use straps fixed between the roll cage and the steering wheel or other kind of standard tools.

The use of a rack centring stopper tool is not recommended because it is difficult to get the steering angle sensor at 0 deg. The most important is to obtain the toe alignment with the sensor at 0 deg.

Proceed as following:

- Switch on main and ignition switches.
- Turn left and right to get the steer angle signal initialized.
- Fix the steering wheel when the steer angle is 0 deg.
- Switch off the ignition and main.
- Proceed now with the alignment jobs.

Note:

- With this process the steering angle signal will be 0 deg with the wheels aligned. This is very important for the steering assistance and for the electronic slip differential behaviour.

4.3 Suspension

	Front	Rear
Wheel ratio	1 mm wheel / 0,9 mm damper	1:1
Bilstein damper travel	110 mm	119 mm

4.4 Front camber and toe adjustments

The front suspension is very special on this car due its kinematic characteristics. To reach the front suspension set-up value is recommended to proceed as following:

1. Car ride height: put the ride height at your choice through damper/spring adjustments.
2. Camber: to change the camber is recommended to move the steering rack arm first. The camber will change quickly.
3. Toe: to change the toe enlarge or reduce the wishbone adjustment.
4. Check: adjust a second time if necessary.

Note:

- Although this process seems strange, it is the best and faster way to obtain the camber and toe adjustments.

Front wishbone adjustment:

Underneath the front wishbone there is a bolt to control the adjustment movement. Unblock the four screws that are fixing the camber regulator plate and proceed to the adjustment.

Notes:

- After any intervention, fix the wishbone regulator plate bolts in the right tighten.
- Maintain the wishbone regulation plate clean and little oiled between plates.

Front regulation table:

Camber	Toe regulation	Wishbone regulation 1,5 turns = 10' camber
-5.8º	9,5 turns	12 turns
-5,5º	7 turns	8,3 turns
-5º	3,5 turns	4,5 turns
-4,5º	0	0
-4º	-3,5 turns	-4 turns
-3,8º	-6 turns	-7 turns

Note:

- Take care with the maximum and minimum camber. Although physically the camber adjuster can reach higher values, it is not recommended due the drive shaft limitations.

4.5 Rear camber and toe adjustments

To reach the rear suspension set-up value is recommended to proceed as following:

1. Car ride height: put the ride height at your choice through damper/spring adjustments.
2. Camber: to change the camber is recommended to move the "boomerang" arm.
3. Toe: to change the toe enlarge or reduce the rear arm.
4. Check: Adjust a second time if necessary.

Notes:

- The rear camber regulation does not have relation with the toe movement, so it is possible to change rear camber without any toe movement.
- After the camber adjustment job, check that the ball-joint is placed in the middle of its housing.

Rear camber regulation table:

Camber	Arm regulation
-2º	1,5 turns
-2,5º	1 turns
-3º	0,5 turns
-3,5º	0
-4º	-0,5 turns
-4,5º	-1 turns
-5º	-1,5 turns

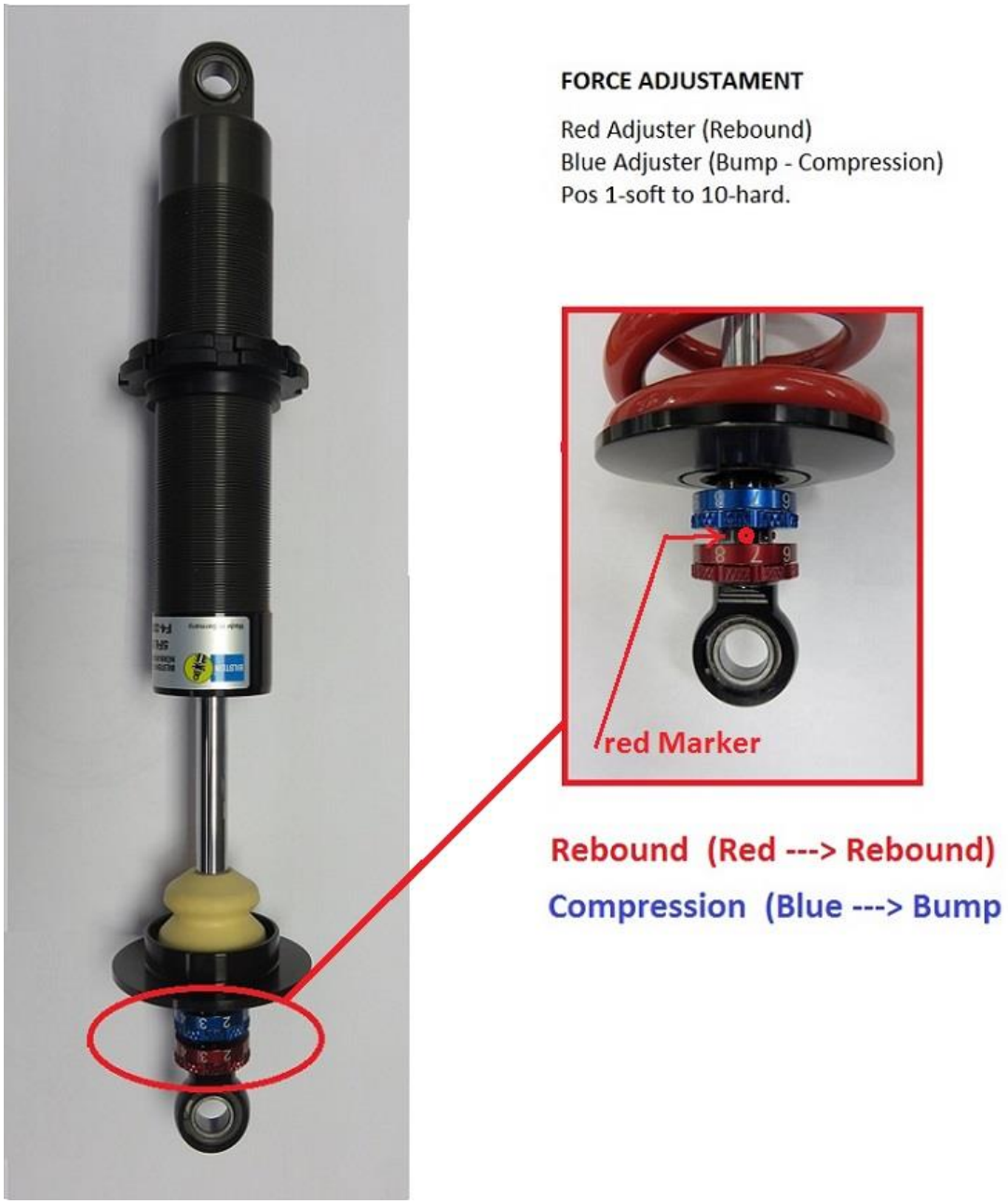
4.6 Dampers

Front dampers
2-way adjustable with 10 clicks in bump and 10 in rebound
Aluminium outer housing
20 mm bump stop (5000 N / 4 mm)

Note:

- Clicks adjuster tool delivered with the car.

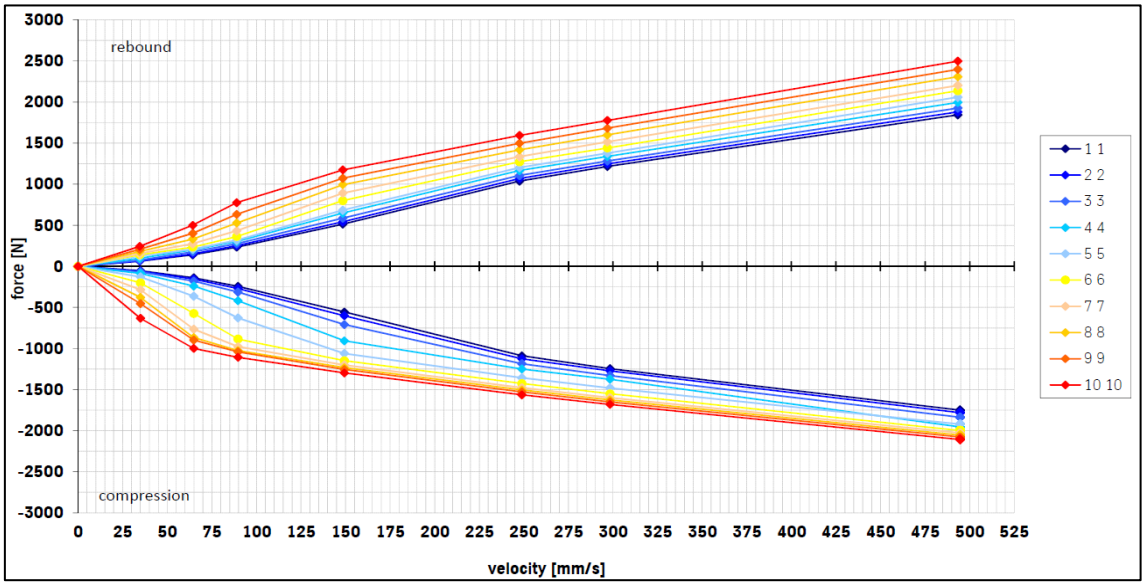
Rear dampers
2-way adjustable with 10 clicks in bump and 10 in rebound
Aluminium outer housing
35 mm bump stop (5000 N / 4 mm)



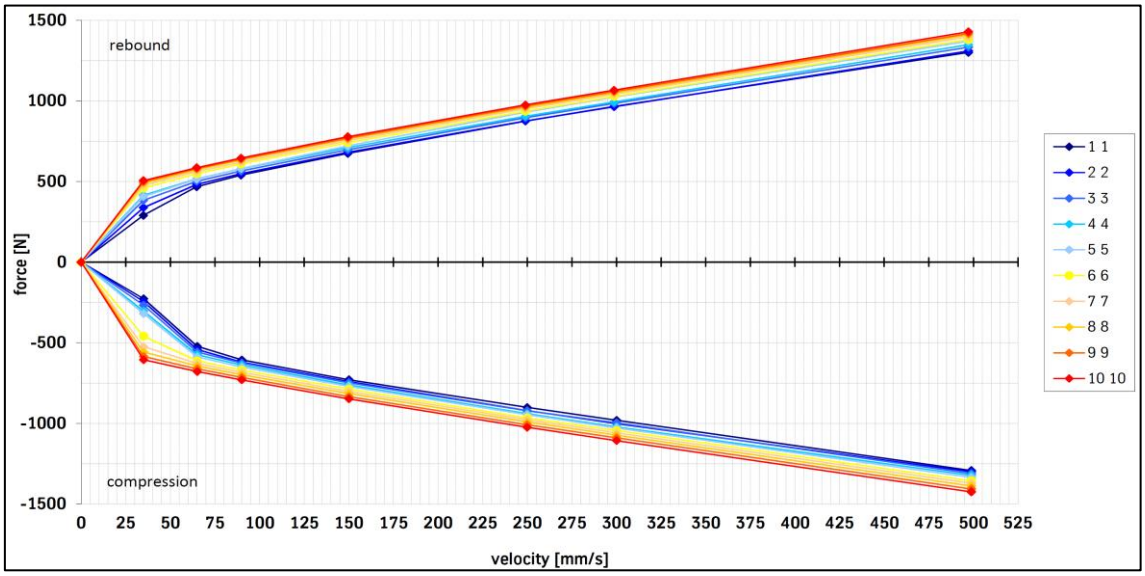
To set-up the suspension, the following spring range can be used in both front and rear axles:

Springs	Nm	Remark
160-60-120	120	Front use recommended
160-60-110 (car delivery - front)	110	Front use recommended
160-60-100	100	Front use recommended
160-60-90 (car delivery - rear)	90	Rear use recommended
160-60-80	80	Rear use recommended
160-60-70	70	Rear use recommended

Adjustment range of front dampers:



Adjustment range of rear dampers:



4.7 Anti-roll bars

Two front anti-roll bars available: 22x2 and 22x3**. Car delivery: 22x3.**

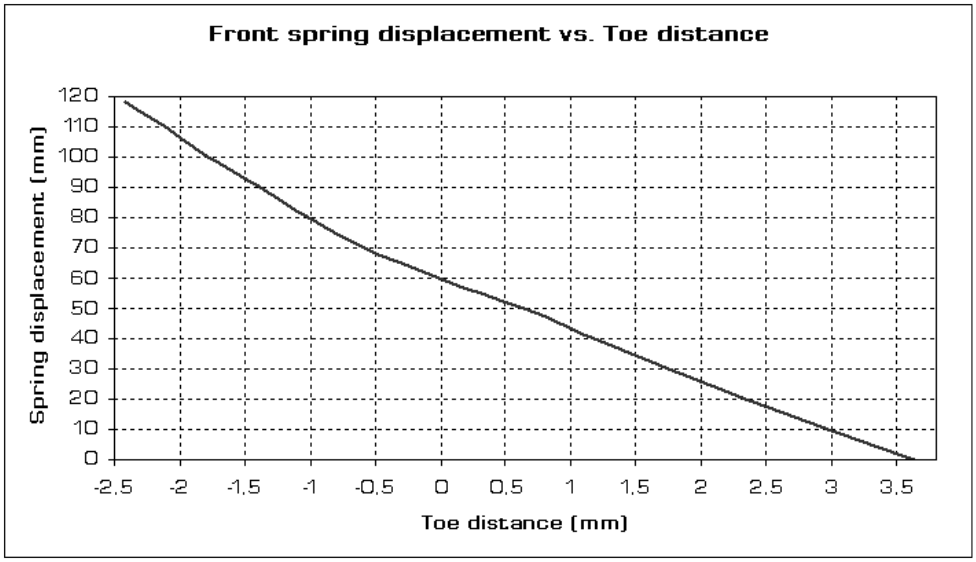
FRONT ARB		
OD (mm)	22	22
Thickness (mm)	2,0	3,0
Chassis Roll Stiffness from ARB		
Hard (Nm/ºChassis)	1548	2021
Mid (Nm/ºChassis)	991	1293
Soft (Nm/ºChassis)	688	898

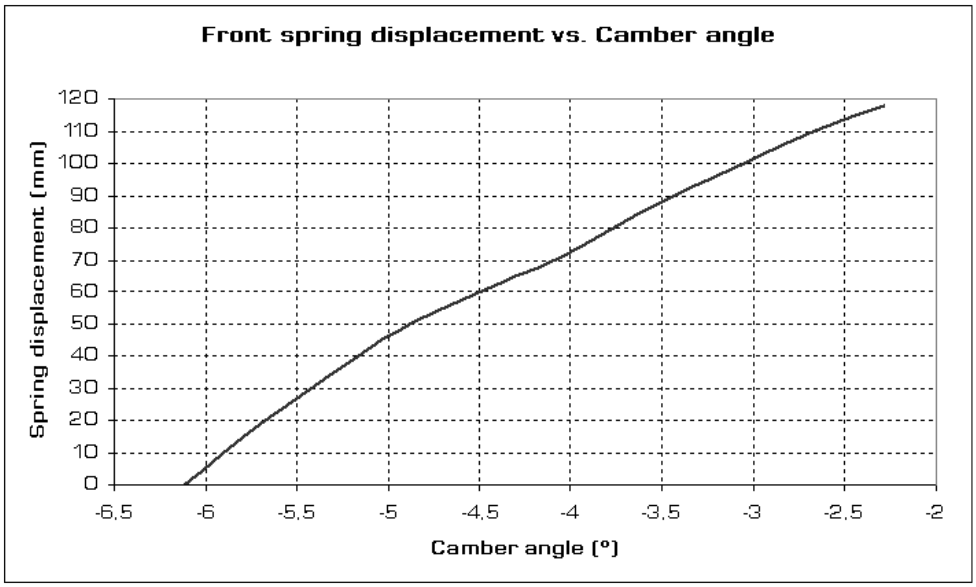
Two rear anti-roll bars available: 22x3 and 22x4**. Car delivery: 22x3.**

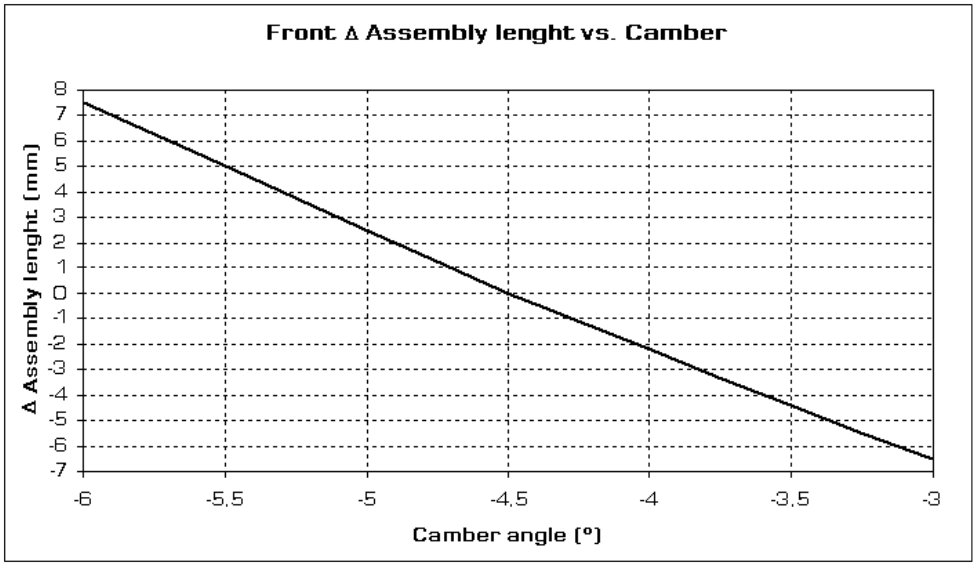
REAR ARB		
OD (mm)	22	22
Thickness (mm)	3,0	4,0
Chassis Roll Stiffness from ARB		
Hard (Nm/ºChassis)	1252	1454
Mid (Nm/ºChassis)	1061	1232
Soft (Nm/ºChassis)	898	1043

4.8 Kinematics

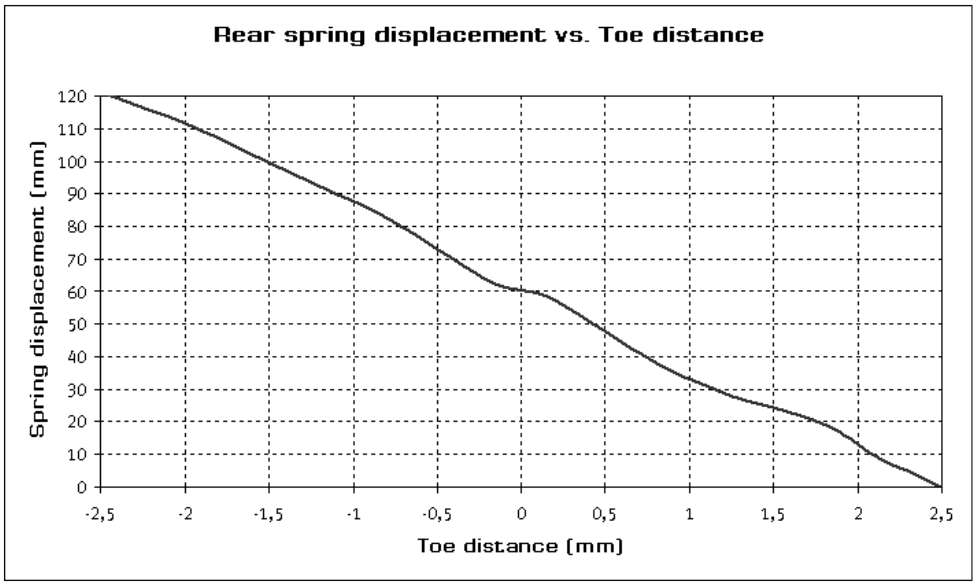
FRONT

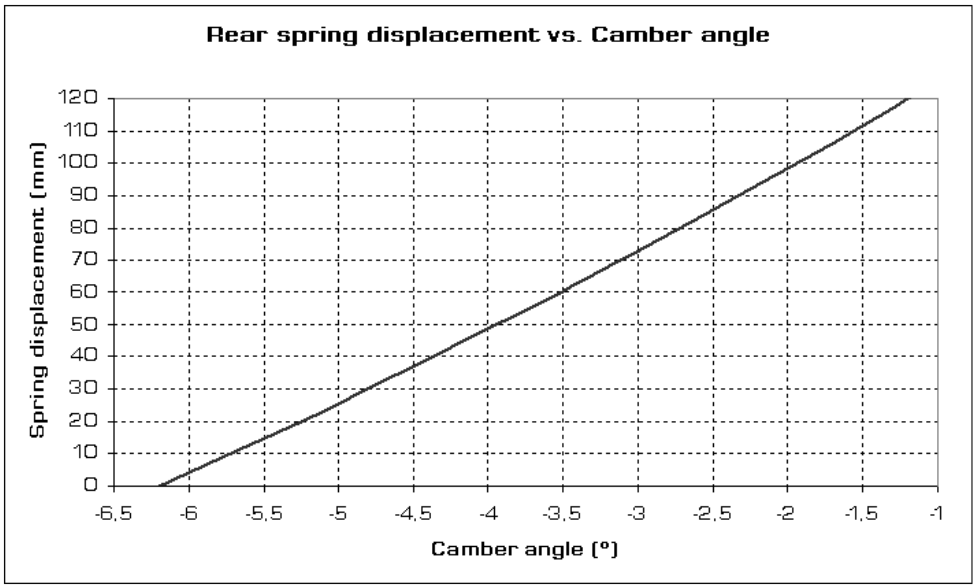


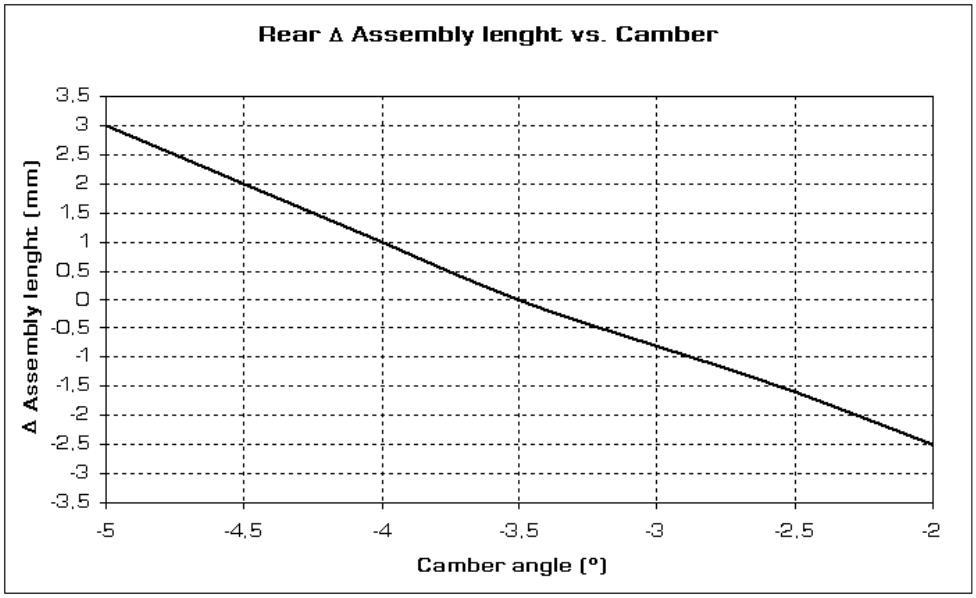




REAR


Rear spring displacement vs. Toe distance
Spring displacement (mm)
120
110
100
90
80
70
60
50
40
30
20
10
0
-2,5
-2
-1,5
-1
-0,5
0
0,5
1
1,5
2
2,5
Toe distance (mm)


Rear spring displacement vs. Camber angle
Spring displacement (mm)
120
110
100
90
80
70
60
50
40
30
20
10
0
-6,5
-6
-5,5
-5
-4,5
-4
-3,5
-3
-2,5
-2
-1,5
-1
Camber angle (°)


Rear Δ Assembly lenght vs. Camber
Δ Assembly lenght (mm)
3,5
3
2,5
2
1,5
1
0,5
0
-0,5
-1
-1,5
-2
-2,5
-3
-3,5
-5
-4,5
-4
-3,5
-3
-2,5
-2
Camber angle (°)

4.9 Brakes

To set-up the brakes, the following pumps can be used in both axles:

Master cylinder	Push Rod	Remarks
AP 15 MM	PRT 110	
AP 15.9 MM	PRT 110	
AP 16.8 MM	PRT 110	
AP 17.8 MM	PRT 110	
AP 19,1 MM	**PRT 110**	**Car delivery front**
AP 20,6 MM	PRT 110	
AP 22,2 MM	**PRT 110**	**Car delivery rear**
AP 23,8 MM	PRT 110	

- It is not advisable to use more than two pump diameters difference between front and rear.
- If the master cylinders are replaced, take care on the correct installation and functioning of the brake balance bar. The following link shows how to assembly correctly: https://tiltonracing.com/wp-content/uploads/2013/07/98-1250-600-Series-Balance-Bars.pdf
- On the dashboard screen it is shown the front/rear pressure and the balance percentage. The recommended percentage is 60% front (car delivery).
- Brake balance channel: $\frac{\text{P\_BRK\_FRONT}}{\text{P\_BRK\_FRONT} + \text{P\_BRK\_REAR}} * 100$

4.10 Aero

It is strongly recommended checking periodically that all aerodynamic parts and their fixations are in good conditions.

Rear wing:

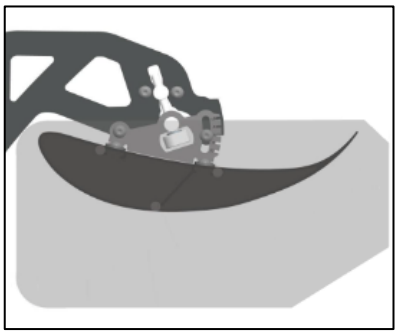
- The rear wing has extensive regulation. Zero is the standard setting for the car.
- Wing angle -5° has considerable influence on the rear down force.
- Wing angle -10º has big influence on the rear down force as well as in drag.
- Lateral plates are individually adjustable.

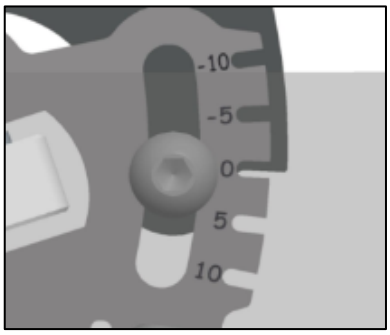
Front splitter:

- Check periodically the fixations. It has to be in good conditions.
- Check the front splitter angle that has to be at 0º when pitch is 0º.

Pitch:

- Measure the pitch angle on the body shell over the door sill.





5 WORKSHOP MAINTENANCE

5.1 First roll-out

SEAT Sport checks all the cars in a roll-out before customer delivery. This roll-out consists in:

- 5 circuit laps.
- High speed in a long straight.
- Start rev limiter checking simulating a standing start.
- Speed limiter function checking.
- After the roll-out, SEAT Sport engineers check the data acquisition and all car functions.

Note:

- Although SEAT Sport does a roll-out, it is strongly recommended to carry out a suspension check before first customer roll-out and after the first practice. Pay speciall attention to sub-frame, power train, engine brackets, fixations, etc.

5.2 Check-list

After any rebuild or main job is recommend to carry out a check-list. It is possible to do it using the Live Measures view in RaceStudio3 and a lap top or directly using car´s display.

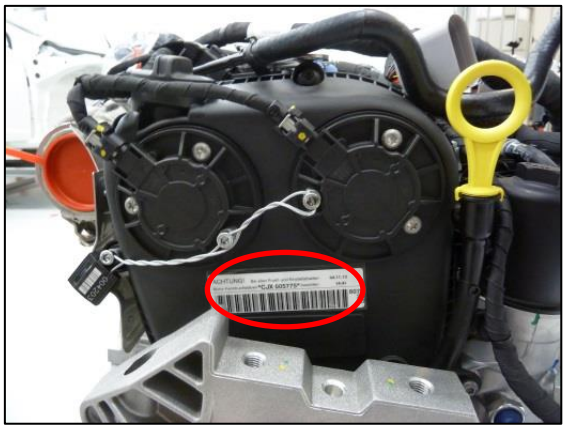
		Check-list with engine stopped	***OK***
ENGINE	**Oil level**	On the dipstick mark / T_oil > 70^{0}C	
	Coolant level	On the bottle mark	
BRAKES	**Brake fluid**	On the bottle mark	
		Steering wheel functions	***OK***
STEERING WHEEL	**Rain lights**		
	Cockpit fan		
	Display change		
	Safety brake signal		
	Windscreen water		
	Wiper		
	High beam		
AIM Live		**Check-list with engine at idle speed**	***OK***
ENGINE	**Water temperature**	87ºC / 92ºC (thermostat cycle)	
	Electrofan	Active at 92ºC	
	P_ENG_OIL (WT<25ºC)	4 bar	
	P_ENG_OIL (WT>25ºC)	2,5 bar	
	P_FUEL	> 4,1 bar	
	Battery voltage	> 13,5 volts	
	Boost pressure	0,3 bar @ 2500 rpm	
	Speed limiter	Check all speed limitations	
GEARBOX	**Tip**		
	Gear display		
	Potentiometer values		
	P_clutch		
FUSEBOX	**FLAG_FBX_1**	0	
	FLAG_FBX_2	0	
	FLAG_FBX_3	0	
	FLAG_FBX_4	0	
	FLAG_FBX_5	0	

5.3 Body-shell and engine identification

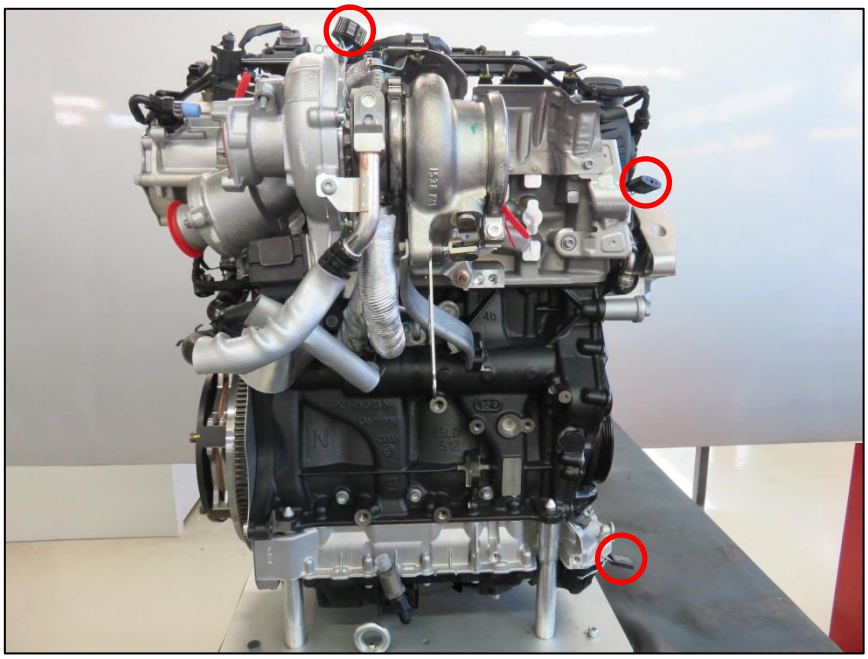
V.I.N. (Vehicle Identification Number) is welded on the roll cage.

Engine number

CJX XXXXXX



Engine seals: boost, distribution and oil sump



5.4 Fluids

Fluids	From	References	Quantity
Engine	Castrol	Castrol Edge 5W-30 VN0000053000	5,7 l
Gearbox	ELF	ELF HTX 755 / 80W-140	1,75 l
Clutch	Castrol	Castrol SRF VN0000062400	-
Drive shaft	VW AG	VN0000040401	100 gr
Coolant	Castrol	VN0000060400	5 l
	VW AG	_G013A8JM1 - 15% add./85% dist. water	
Brake fluid	Castrol	Castrol SRF VN0000062400	-
Fuel	PANTA	NS 102 Ron	-
Windscreen	Free		-

Notes:

- Standard fuel minimum 98 Ron from petrol stations may be used.
- Is recommended not to mixt fuels, they could contaminate one from the other.
- Gearbox is delivered with correct oil level. It is not necessary any level control if there is no leakage.

5.5 Engine

Control routine before start to run:

- Check the oil level: with oil temperature up to 70°C, stop the engine and wait 2 minutes, then check the oil dipstick. The oil level must be at the top of the marked zone.
- Check the water level before start.
- With the engine running, check that there is not any oil, water or fuel leakage.
- Check the fan functionality. Operating range 92°C to 87°C.

Maintenance routine:

- Change the engine oil and oil filter at the indicated mileage.
- Engine spare parts must be from VW group or SEAT Sport original parts, detailed on the SEAT Leon Cup Racer TCR parts catalogue.
- Use always the fluids detailed above, User Manual point 5.4.
- Clean and check the air filter at least once per event. At urban circuits, clean or replace it more frequently. It is recommended to have two or three air filters and replacing it during the weekend. Changing it is strongly recommended in case of rain.
- Check that the alternator belt is clean and that there are not small stones inside the Poly-V.
- Clean the radiator and intercooler panel often.
- If any doubt, contact SEAT Sport service.
- Check that the seals are in good conditions, if a replacement is needed contact SEAT Sport.

Parts subject to frequent service:

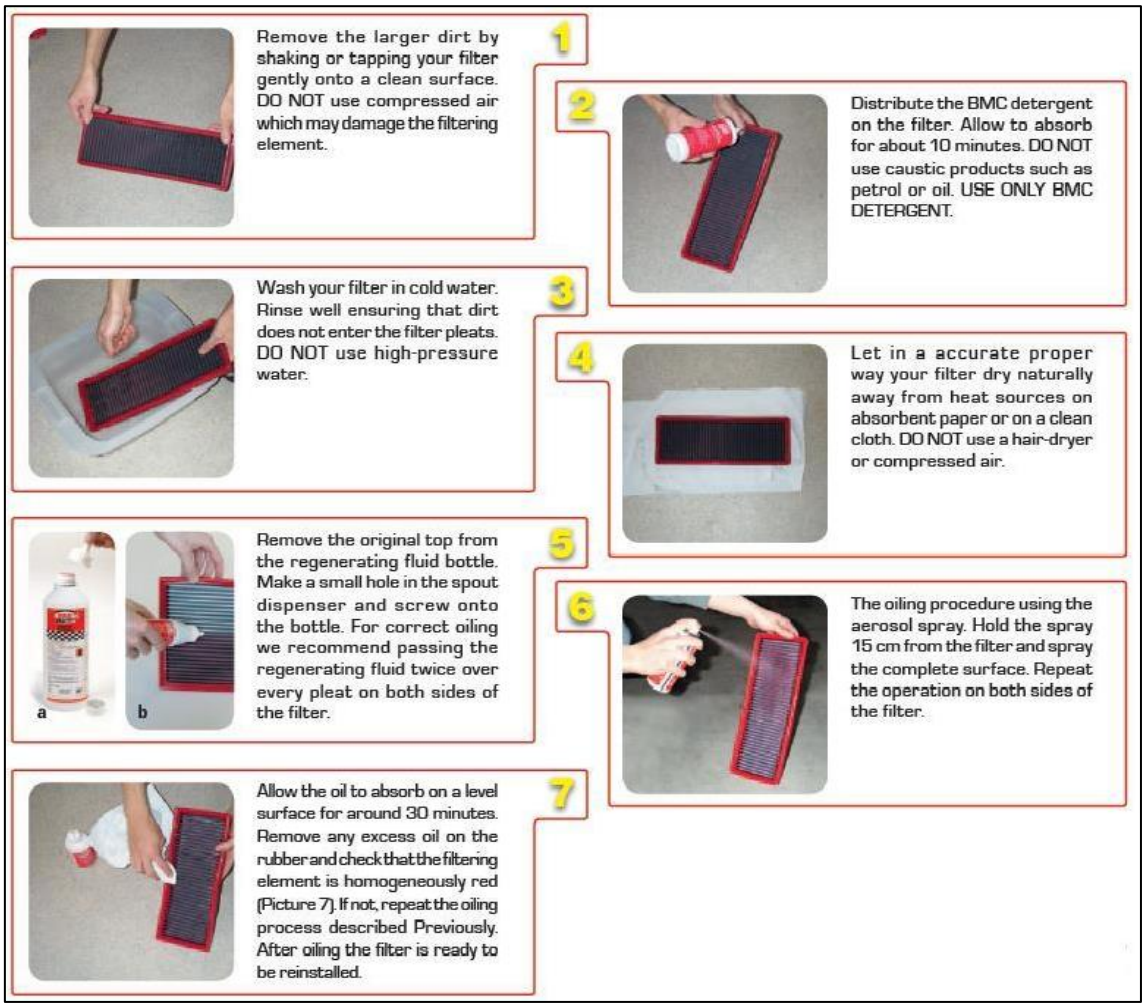
Engine	Torque	Remarks
Oil drain plug	By hand	
Oil filter plastic cover	50 Nm	
Oil filter		Moisten the “O” ring
Spark plug	28 Nm	Use only original parts

For detailed parts substitution information download the Workshop Manual from SEAT Sport website:

http://www.seat-sport.com/seat-leon-cup-racer-2016/

5.6 Air filter

Standard air filter cleaning procedure:

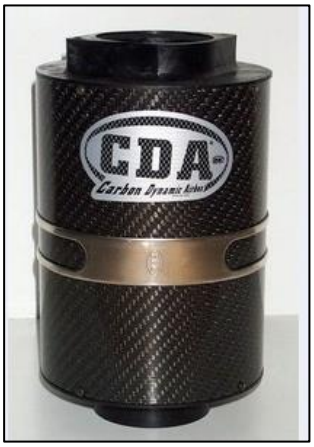


Parts subject to frequent service:

Air filter	Torque	Remarks
Substitution	By hand	Be careful tightening the small bolts over plastic
Cleaning		Clean the cotton air filter following the procedure shown above. Do not use compressed air or high-pressure air to clean. Use only recommended oil for cotton filters.

Notes:

- The air filter type and measurements are identified on the Technical Form. It is not allowed any modification or change.
- A clean and properly oiled air filter is basic to ensure boost's life. It is strongly recommended to follow the cleaning procedure as well as the replacement frequency.
- After rain conditions use, it is strongly recommended the cleaning or replacement.



5.7 SADEV ST82-17 gearbox

Control routine before start:

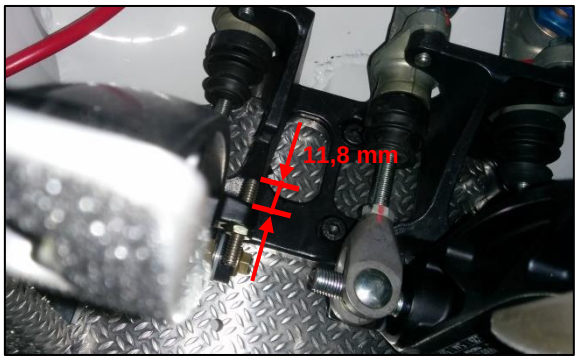
- Check that there is no oil leakage.
- Operating range 70°C to 145°C. Do not load the engine until the temperature is above 70°C.

Routine maintenance:

- Change the gearbox oil and clean the filter in the indicated mileage. The oil must be the recommended one. It can be done with the gearbox mounted on the car.
- It is strongly recommended reading the SADEV ST82-17 Technical Manual on the SEAT Sport website.

  http://www.seat-sport.com/seat-leon-cup-racer-2016/

- Make sure that the clutch pedal stopper stud exits 11,8 mm from its support.



Potentiometer adjustment:

Using the display or the live measures label of the RaceStudio3 software with a lap top adjust the potentiometer if any malfunction has been detected.

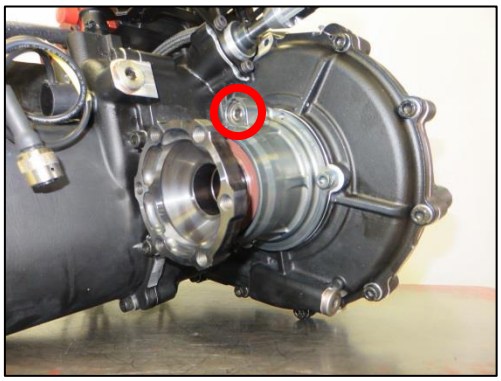
Potentiometer regulation table:

Acquisition channel	Gear	Value
U_GCU_GEAR	R	572 mV
	N	1100 mV
	1	1630 mV
	2	2160 mV
	3	2700 mV
	4	3230 mV
	5	3765 mV
	6	4300 mV

5.8 LSD – Limited Slip Differential

The differential is a self-locking type, with 6 frictions faces on each side and pressure plates with ramps, acting either for power or braking phases. The running clearance in the differential is 0.1±0.05mm.

The preload may be adjusted by tightening/untightening the preload nut (see the picture below).



External preload adjustment process:

It is important to note that the lock nut must be pushed while turning (the tool must push the lock nut completely straight in order to be able to move the nut all the necessary travel). Note that it is made by "clicks" (20 "clicks" per revolution). Then, it is therefore to stop on a "click" to be sure of the good lock nut desired position.

- It is not necessary to remove the left driveshaft.
- Lock the right driveshaft or wheel.
- Use the hex-head spanner of 8 mm in order to tighten/untighten the nut marked above. Then you can adjust the preload:
  - By turning clockwise in order to decrease the preload.
  - By turning anti-clockwise in order to increase the preload.

Note:

- There is a second way to adjust the preload:
  - Push the lock nut with the 8 mm hex-head spanner and hold it by hand.
  - Turn the right wheel forward to increase the preload or backwards to decrease.

Preload checking process:

- Lock the left wheel using the driveshaft bolt spanner with a dynamometer.
- Turn the right wheel and check on the dynamometer the preload value.

Notes:

- Recommended preload range between 50 and 100 Nm. The cold measured preload is approximately 15% higher than warm measure.
- Preload decreases from approximately 15% after 50 kilometres of running.
- Different ramps are available on SADEV Parts Catalogue. Only the ramps homologated on the SEAT Leon Cup Racer TCR Technical Form can be used: 60/30, 45/30 and 35/30.
- For detailed information see the SADEV ST82-17 Technical Manual on the SEAT Sport website:

http://www.seat-sport.com/seat-leon-cup-racer-2016/

5.9 Fuel tank

The new 100l FIA FT3 fuel tank is working with one unique fuel pump coming from series and a complex Venturi hoses system. The pump is controlled through a series PWM fuel control module.

Fuel tank features	Description
Fuel tank type	FIA FT3 homologated fuel tank
Capacity	104 l ±2%
Minimum fuel level before engine fault	Less than 1 litre
Ventilation valve	FIA homologated roll-over, ventilation and 200 mbar pressure regulator valve
Refuelling	Safety FIA plug

Refuelling tool:

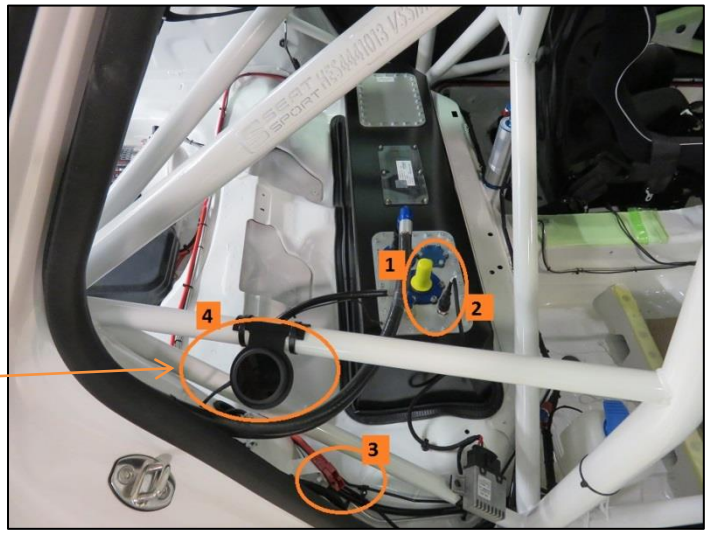
The fuel tank is served with a FIA approved fast coupling plug. The socket is the necessary connector-tool that has to be used for refuelling the tank. This part is available on the 2016 Parts Catalogue.

Refuelling process:

1. Prepare an external bottle with the desired quantity of fuel. It is recommended using a ground cable on the bottle to avoid static electrical discharges.
2. Connect the refuelling hose with the socket to the fuel tank plug (#1 on the picture below) and the fuel will flow inside.
3. Set the fuel level display with the fuel amount inside the tank. This value will be shown on the display. For more info about the fuel level display check point 3.5 on this User Manual.
4. Pay special attention to the fuel amount refuelled and be accurate when setting the fuel level display, the driver will not feel any power engine drop until there is less than one litre inside the tank. Never try one lap more after a power drop.

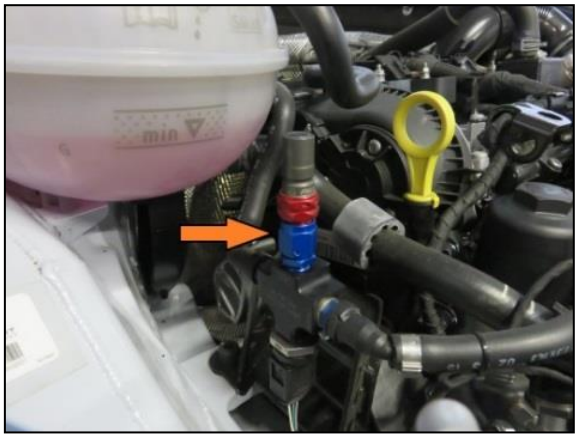
Fuel tank placed on the car

1. Fuel tank refill plug
2. Fuel pump connector
3. Battery supply
4. Fuel level display



Fuel draining tools:

On the car there is a FIA fast coupling plug placed on the engine bay fuel line ready for draining use.



There are two tools available on the 2016 Parts Catalogue. First, there is a contra-connector D-6 socket available to connect in the fuel line plug that opens the circuit for draining.

Secondly, SEAT Sport has developed a new electronic tool to activate the fuel tank pump permanently or with the new automatic function.

Fuel draining process:

1. Connect the electric tool on the fuel pump connector (#2 on the picture above), placed on the fuel tank, and the power supply on the auxiliary battery connector (#3).
2. Connect the fuel socked connector on the engine bay.
3. Switch on the electric tool in automatic or manual mode. If the automatic mode is selected the tool will stop the draining process when it detects that there is no more fuel inside the tank.

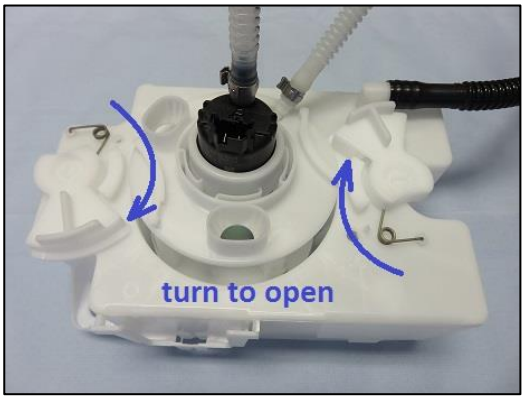
Flow fuel pump filter cleaning process:

1. Drain out the fuel tank completely.
2. Open the fuel tank right side cover (picture 1).
3. Raise a little bit the plate and disconnect the pipes and wirings.
4. Turn the fastening and pull up the pump from the reservoir (picture 2). Pull hard the black hoses to disconnect them from the main pump. Don't forget clipping them hard again when mounting.
5. Remove the green mesh filter and clean it (picture 3).

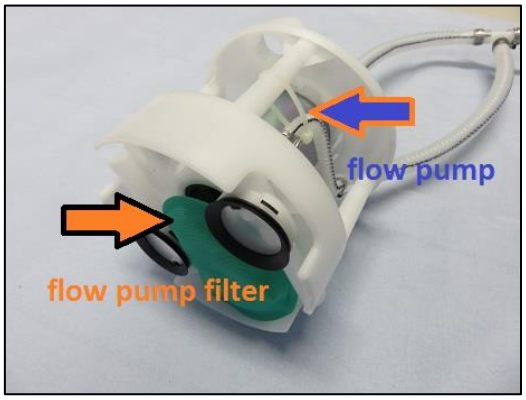
In case you need to take out the reservoir, unclip the green plastic brackets and pull-up the reservoir (picture 4).

Picture 1

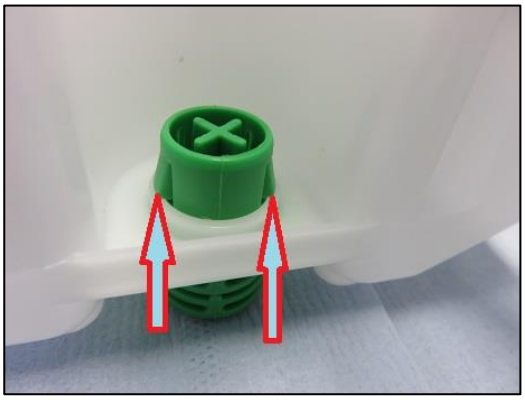
Picture 2



Picture 3



Picture 4

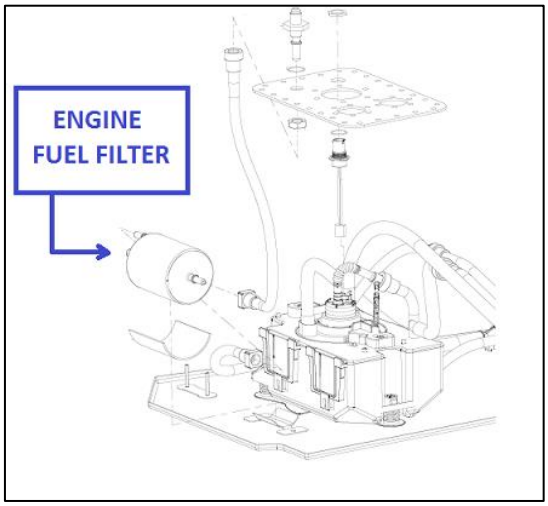


Engine fuel filter replacing process:

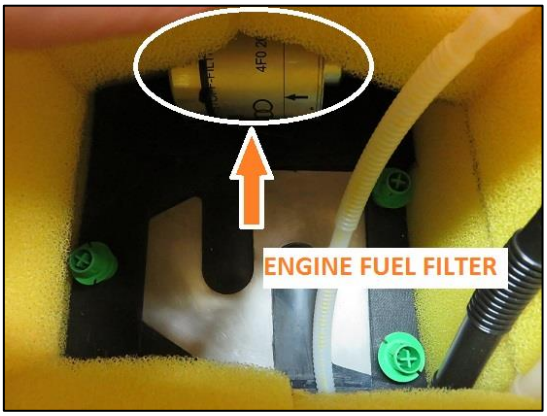
The engine fuel filter is placed inside the fuel cell. The part is fixed by a tie-wrap and fuel pipes are connected by fast couplings.

1. Drain out the fuel tank completely.
2. Open the right cover of the fuel tank.
3. Separate the inner foam and introduce the hands inside to cut the tie-wrap and disconnect the fuel pipes.

Schematic view of the engine fuel filter placement:



Engine fuel filter placement inside the fuel cell:

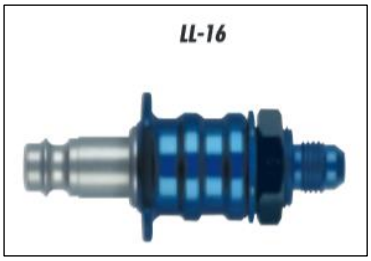


5.10 Airjacks

The SEAT Leon Cup Racer TCR is provided with an airjack system. The connector is placed on the rear right side (inside the standard refuelling cover).

Airjack plug on the car:

Airlance view:



Notes:

- Maximum air pressure is 30 bar.
- Inlet thread of the airlance is M16x1.5

- **IMPORTANT:** never work under a vehicle supported only by airjacks unless safety props are fitted.
- Do not use 'U' bolt type clamps as distortion of the body will cause the airjack to stick. Do not loosen or remove adaptor. Jacks must be vertical during operation. Mounting brackets or clamps to be fitted to threaded section of body only.
- Do not use petrol or paraffin for cleaning the airjacks as this will damage the rubber seals. Use an alcohol based cleaning fluid as Methylated Spirit. Use only silicone spray or silicone grease when internal lubrication is necessary.

6 PARTS MILEAGE

Engine	Inspection	Service / km	Change	Remark
Engine		7.000	12.000	SEAT Sport service
Spark plug			1.000	Use original parts only
Engine oil			1.000	Use recommended oil only
Oil filter			1.000	Use original parts only
Cotton air filter	Once per event	Once per event	season	2 units rolling change adv.
Poly-V belt	Once per event		1.000	

Fuel tank	Inspection	Service / km	Change	Remark
Flow pump filer	1.000			First inspection 150 km
Engine fuel filter			3.000	Use original parts only

Transmission	Inspection	Service / km	Change	Remark
Gearbox and diff	2.000			
Gearbox oil			500	Use recommended oil only
Gearbox oil filter				Clean each oil change
Differential preload	Once per event			
Clutch	2.000			Check when vibrations
Drive shaft	Once per event		2.500	

Front axle	Inspection	Service / km	Change	Remark
Front dampers		4.000 / 1 year	8.000	SEAT Sport service
Ball joints	Once per event		5.000	Always check tolerance
Steering rod inner joint	Once per event		5.000	Always check tolerance
Steering rack			15.000	
Steering handle	Once per event		4.000	Inspect cracks
Wheel hub	Once per event		10.000	Change when noise
Front discs	Once per event		1.500	Change when cracks
Disc bells	Once per event		5.000	Check float in disc
Brake balance bar	Once per event	4.000		

Rear axle	inspection	Service / km	Change	Remark
Rear dampers		4.000 / 1 year	8.000	SEAT Sport service
Ball joints	Once per event		5.000	Always check tolerance
Wheel hub	Once per event		10.000	Change when noise
Rear discs			3.000	
Wheel nuts			3.000	

Safety parts	Service / km	Change	Remark
Extinguisher	5 years	7 years	SEAT Sport or OMP service
Backet		5 years	
Safety belts		5 years	
Fuel cell	5 years	7 years	

7 SAFETY

Part	Remarks	Images
Airjack	3 airjacks on the car Max pressure 30 bar Safety props: for any job under the car use always airjack safety props (x3).	
Extinguisher	Material: aluminium. Weight: 6,2 kg. Activation: electric. Use: cockpit and engine bay. Check the inner press bottle. It has to be in the green area. Fire extinguisher system: check always that the 9V inner battery is in good conditions. Do not forget to put the toggle in ON when car is running.	 
Backet	FIA Homologated 8855 - 1999 Gel coated fiberglass shell W side fixing points HANS compatible Check the homologation label expiry date period. Check always the fixations. Change if big crash.	
Safety belts	Check always that the fixations are correctly fixed. Check the homologation label expiry date period. Check always that the driver is strongly fixed.