

24H SERIES

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Balance of Performance Publication

Date: 11.03.2020

Hankook 12H ESTORIL 2020

To Sporting & Technical Regulations 24H SERIES EUROPE powered by Hankook 2020
(version 11 July 2019 with KNAF permit nr. 0314.19.292)

Dear Teams and Drivers

In this BOP-publication you will find:

- Balance of Performance (BOP)
- SP-BOP-CAT (Theoretical best lap times).

This BOP and other figures are in force with immediate application and replaces the figures of appendix 11 of the Sporting & Technical regulations and eventually previously published BOP-publications.

Notes on boost control:

Control of Pboost strategy as per document attached (Appendix: Control of Pboost strategy is updated), for all cars of which Pboost max is specified, unless explicit otherwise specified.

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Class TC: Touring Cars

Brand & Type	Cylinder capacity	Turbo	Minimum Weight	Max Refuelling amount	Remarks
BMW M240i Racing Cup	3000 cc	Twin Turbo	1440 kg	85 L @ Green 85L @ Code60	According to BMW M240i Cup regulations 2020 Car height minimum 100mm
BMW E46 M3	3200 cc	No	1200 kg	120 L	

Please note: Art. 4.1 of Appendix 1 of the Sporting & Technical regulations
Your (TC) car not listed here? Please make an individual request to info@creventic.com

Class TCX: Special Touring Cars

Brand & Type	Cylinder capacity	Turbo	Minimum Weight	Max Refuelling amount	Remarks
Ligier JS2 R	3700 cc	No	1050 kg	110 L	
Ginetta G55	3700 cc	No	1100 kg	110 L	
Porsche Cayman GT4 Club Sport	3800 cc	No	1325 kg	110 L	
BMW M240i Racing Cup	3000 cc	Twin Turbo	1440 kg	85 L @ Green 85L @ Code60	Technical Regulations according Class TCX Car ride height is free

Please note: Art. 3.5 of Appendix 4 of the Sporting & Technical regulations
Your (TCX) car not listed here? Please make an individual request to info@creventic.com

Class TCR BOP and ECU-software version

Brand & Type	Minimum Weight	Max Refuel amount	Ride height	TCR Technical form	Power level (%)	SW Name ECU-software version	SW Identification (Checksum or ID)	Max Pboost* & Rev limiter	Correct (mbar/C)
ALFA ROMEO GIULIETTA RF TCR	1215 kg	100 L	70mm	22					
AUDI RS3 LMS SEQ	1240 kg	100 L	70mm	10					
AUDI RS3 LMS DSG	1240 kg	100 L	70mm	9					
CUPRA TCR SEQ	1230 kg	100 L	70mm	35					
CUPRA TCR DSG	1230 kg	100 L	70mm	43					
HONDA CIVIC FK7 TCR SEQ (2018)	1295 kg	100L	80mm	33					
HONDA CIVIC FK2 TCR SEQ (2017)	1255 kg	100L	70mm	11					
HYUNDAI i30 N TCR	1295 kg	100 L	90mm	27					
HYUNDAI Veloster N TCR	1295 kg	100L	90mm	97					
KIA CEE'D TCR	1235 kg	100 L	70mm	24					
OPEL ASTRA TCR	1230 kg	100 L	70mm	5					
PEUGEOT 308 TCR (Sprint)	1200 kg	100 L	70mm	37					
PEUGEOT 308 TCR (Endurance)	1240 kg	100 L	70mm	37+VO endurance					
RENAULT MEGANE RS TCR	1245 kg	100 L	60mm	39					
SUBARU STi TCR	1215 kg	100 L	70mm	7					
VOLKSWAGEN GOLF GTI TCR SEQ	1230 kg	100 L	70mm	14					
VOLKSWAGEN GOLF GTI TCR DSG	1230 kg	100 L	70mm	12					
SEAT LCR TCR V3 DSG	1230 kg	100 L	70mm	15	102.5	5F6906259L	CVN	See CUPRA DSG	

**TCR ECU-software MUST be according
TCR Technical Bulletin no. 01 / 2020
See next pages**

Your (TCR) car not listed here? Please make an individual request to info@creventic.com

*Boost pressure will be monitored and interpreted according to the TCR Technical Bulletin no. 13 / 2019. (Date: 2019, September 11th) (TCR Turbocharger Boost Pressure Monitoring Method)

Class TCR ECU-software version 1 of 2 (updated to Bulletin no. 01/2020)

2020 TCR TECHNICAL BULLETIN no. 1



Imposed parameters for Certified Software

Model	Power level [%]	SW Name	SW ID or Checksum	Check Method	Rev limiter	Max Boost Pressure [mbar] / engine revs							Correct. [mbar/°C]	
						Revs	4600	5100	5600	6100	6600	7100		Boost
Alfa Romeo Giulietta RF TCR	100	1.639_TCR2019_BOP_100 %	34882/10107	CAN hi/lo	7100	Revs	4600	5100	5600	6100	6600	7100	1	
						Boost	2500	2705	2700	2700	2680	2660		
Alfa Romeo Veloce TCR	100	1.639_TCR2019_BOP_100 %	34882/10107	CAN hi/lo	7100	Revs	4600	5100	5600	6100	6600	7100	1	
						Boost	2500	2705	2700	2700	2680	2660		
Audi RS 3 LMS SEQ	100	5F6906259AB	CVN	OBD	7000	Revs	4500	5000	5500	6000	6500	7000	9	
						Boost	2380	2510	2620	2630	2400	2250		
Audi RS 3 LMS DSG	102.5	5F6906259L	CVN	OBD	7000	Revs	4500	5000	5500	6000	6500	7000	5	
						Boost	2450	2450	2630	2650	2580	2520		
CUPRA SEQ	100	5F6906259AB	CVN	OBD	7000	Revs	4500	5000	5500	6000	6500	7000	9	
						Boost	2380	2510	2620	2630	2400	2250		
CUPRA DSG	102.5	5F6906259L	CVN	OBD	7000	Revs	4500	5000	5500	6000	6500	7000	5	
						Boost	2450	2450	2630	2650	2580	2520		
Honda Civic FK7 TCR	100	TCR_H70_1.02.35	100	ECAL	7500	Revs	4500	5000	5500	6000	6500	7000	7500	9
						Boost	2310	2370	2490	2490	2410	2290	2290	
Honda Civic FK2 TCR	100	TCR-V2.7.98+7.5	100	ECAL	7100	Revs	4700	5200	5700	6200	6700	7100	2	
						Boost	2130	2275	2415	2550	2540	2370		
Hyundai i30N TCR	97.5	V1.639.X1_i30_TCR2019_975_v3	44078/2007	CAN hi/lo	7000	Revs	4500	5000	5500	6000	6500	7000	2	
						Boost	2200	2255	2320	2340	2340	2520		
Hyundai Veloster	97.5	V1.639.X1_i30_TCR2019_975_v3	44078/2007	CAN hi/lo	7000	Revs	4500	5000	5500	6000	6500	7000	2	
						Boost	2200	2255	2320	2340	2340	2520		
KIA Cee'd TCR	100	1502_KIA_TCR_100%_WS_C_BoP_19_final	Firmware ID	Motec tool	6900	Revs	4400	4900	5400	5900	6400	6900	1	
						Boost	2430	2545	2570	2560	2550	2530		
Lada Vesta Sport TCR	100	SRG_MMGEN_14X8_12.10.4.3a	0x4A2D1916/0x8E640174	Marelli	6750	Revs	4200	4700	5200	5700	6200	6750	2	
						Boost	2150	2340	2580	2780	2675	2540		
Lada Vesta TCR	100	SRG_MMGEN_14X_12.10.1.3	0xFC35A13A/0x2BEBC88A	Marelli	6750	Revs	4200	4700	5200	5700	6200	6750	2	
						Boost	2230	2270	2370	2500	2420	2200		

Class TCR ECU-software version 2 of 2 (updated to Bulletin no. 01/2020)

2020 TCR TECHNICAL BULLETIN no. 1



Model	Power level [%]	SW Name	SW ID or Checksum	Check Method	Rev limiter	Max Boost Pressure [mbar] / engine revs							Correct. [mbar/°C]
						Revs	4700	5200	5700	6200	6700	7200	
Lynk&Co 03 TCR	97.5	LynkCo 03 TCR Engine Custom ECU 97% v2.02	Firmware ID	Motec tool	7200	Revs	4700	5200	5700	6200	6700	7200	4
						Boost	2370	2400	2420	2420	2440	2390	
Opel Astra TCR	102.5	12.7.3.32_BOP_2019_102prozent_final	0x08AFD417	CAN hi	6900	Revs	4400	4900	5400	5900	6400	6900	2
						Boost	2300	2465	2620	2610	2520	2260	
MG6 XPOWER TCR	100.0	MG6_SRG_MAP_Dyno2310_19_BoP_101	0x3FE3A46E	CAN hi/lo	7400	Revs	4900	5400	5900	6400	6900	7400	2
						Boost	2130	2130	2140	2190	2190	2190	
Peugeot 308 TCR	102.5	TCR_121030_VSCC_102.5_BOP_2019	0x87752a77	MapSel 1	7300	Revs	4800	5300	5800	6300	6800	7300	1
						Boost	2530	2630	2750	2810	2810	2800	
Peugeot 308 Racing cup	102.5	TCR_121030_VSCC_102.5_BOP_2019	0x2d56713d	MapSel 2	7100	Revs	4600	5100	5600	6100	6600	7100	1
						Boost	2630	2650	2670	2760	2780	2670	
Renault Mégane RS TCR	100	059_Megane TCR VMTCR_6900 rpm_100%	BOP_26-04-19_100	A2L	6900	Revs	4400	4900	5400	5900	6400	6900	1
						Boost	2630	2630	2660	2660	2660	2660	
Subaru STI TCR	102.5	Subaru_STI_TCR_2019_BoP_102	Firmware ID	Motec tool	7200	Revs	4700	5200	5700	6200	6700	7200	2
						Boost	2345	2450	2750	2700	2500	2400	
VW Golf GTI TCR SEQ	100	5F6906259AB	CVN	OBD	7000	Revs	4500	5000	5500	6000	6500	7000	9
						Boost	2380	2510	2620	2630	2400	2250	
VW Golf GTI TCR DSG	102.5	5F6906259L	CVN	OBD	7000	Revs	4500	5000	5500	6000	6500	7000	5
						Boost	2450	2450	2630	2650	2580	2520	
VW Golf GTI TCR C-ECU	100	SRG140_VAG_12.11.1.9_BO_P_100%_2019_Final_2.cfx	A4846272	Marelli	7200	Revs	4700	5200	5700	6200	6700	7200	3
						Boost	2510	2510	2485	2440	2340	1380	

Boost pressure will be monitored and interpreted according to the TCR Technical Bulletin 13/2019 by moving car. Values between reference points are piece wise cubic interpolated. The given values are referenced to scrutineering data channel Tmanifold at 40°C.

It is not allowed in any circumstances to exceed the highest listed boost pressure values.

The boost pressure below the 2500rpm monitored area is limited to the value at the lowest rpm of the reference window.

Accepted limit violation:

- 0,3% of the total valid data points with the highest values in regard to the low over boost limits (30mbar < p Boost < 100mbar relative to the corresponding Max Boost Pressure)
- 0,1% of the total valid data points with the highest values in regard to the high over boost limits (p Boost ≥ 100mbar relative to the corresponding Max Boost Pressure)

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Class GT4: GT4 Grand Touring Cars

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	Restrictor	Remarks *
ASTON MARTIN V8 VANTAGE GT4	4700cc/8cyl	1350 kg	100 L	NA	ECU BOP 2016
ASTON MARTIN VANTAGE AMR GT4	4000cc/8cyl Turbo	1450 kg	105 L	NA	Max Pboost bar/rpm 1,660/4000 1,730/4500 1,680/5000 1,680/5500 1,640/6000 1,610/6500 1,610/7000
Audi R8 LMS GT4 (Evo 2019)	5200cc/10cyl	1470 kg	110 L	2x41mm	Restrictor thickness 5mm. Acc. Audi R8 GT4 restrictor drawing ECU BOP 2018
Audi R8 LMS GT4 (Evo 2020)	5200cc/10cyl	1490 kg	110 L	2x41mm	Restrictor thickness 5mm. Acc. Audi R8 GT4 restrictor drawing ECU BOP 2018
BMW M3 GT4		1350 kg	110 L	NA	ECU BOP 2015
BMW M4 GT4	3000cc/6cyl Turbo	1460 kg	110 L	2017 USB Powerstick "Silver" (Max Engine power: 440Hp)	
CHEVROLET CAMARO GT4		1450 kg	100 L	60mm	FIA-restrictor design ECU BOP 2018
GINETTA G55 GT4 Evo 2015	3700cc/6cyl	1080 kg	120 L	NA	ECU BOP 2015
GINETTA G55 GT4 Evo 2017/2018	3700cc/6cyl	1100 kg	95 L	68mm	Restrictor: G55-E0398 FIA-restrictor design
KTM X-BOW GT4	2000cc/4cyl Turbo	1130 kg	70 L	Max Pboost 2,0 bar Max rpm 7000 rpm (at all gears)	
LOTUS EVORA GT4		Tba	Tba	Tba	
MCLAREN 570S GT4	3800cc/8cyl Turbo	1440 kg	110 L	Max engine Torque 470Nm Max Pboost 1,8 bar ECU BOP 2018	
MERCEDES AMG GT4	4000cc/8cyl Turbo	1460 kg	100 L	Max Pboost 1,63 bar (Power Level 3) (Max Engine power: 295kW)	
NISSAN 370Z GT4	3800cc/6cyl	1250 kg	100 L	Tba	ECU BOP 2016/2017
PORSCHE 997 CUP GT4	3800cc/6cyl	1250 kg	95 L	NA	ECU BOP 2014
PORSCHE CAYMAN GT4 CLUPSPORT MR	3800cc/6cyl	1272 kg	100 L	ECU 2018 BOP	
PORSCHE 718 CAYMAN GT4 CS MR	3800cc/6cyl	1330 kg	100 L	ECU 2019 BOP	
SIN R1 GT4	6200cc/8cyl	1250 kg	100 L	NA	Max 43,5% Throttle opening and 6000 rpm MAX

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* Specified Max Pboost pressure are absolute pressure at ambient of 1010mbar.

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Class 991: Porsche 991 Cup classes (Generation I and II) Including BOP- table class 991-PRO & 991-AM

Type	BOP**	Minimum Weight	Max Refuelling amount	Remarks
Cup 991-I (3800cc)	BOP-AM	1220 kg	100L	Models 2013 .. 2016 NO Restrictor-Blende
Cup 991-I (3800cc)	BOP-PRO	1220 kg	90L	Models 2013 .. 2016 *Restrictor-Blende: 65 mm
Cup 991-II (4000cc)	BOP-AM	1230 kg	100L	Models 2017 .. 2019 *Restrictor-Blende: 65 mm
Cup 991-II (4000cc)	BOP-PRO	1230 kg	90L	Models 2017 .. 2019 *Restrictor-Blende: 59 mm

* Restrictor Blende must be according "Manthey TZN" drawing, see 24H Series bulletin

** Class and corresponding BOP is determined by Team composition (Drivers categories)

Please note: In case Class 991-AM and 991-PRO is combined to one Class 991, the BOP, 991-AM-BOP or 991-PRO-BOP is still applicable determined by Team composition (Drivers categories)

Class GT3-BOP-TABLE BOP- table class GT3-PRO & GT3-AM

Class*	BOP	Balance of Performance**	
		Weight	Refuelling
GT3-PRO	BOP-Pro	+ 30 kg	-/- 5 L
GT3-AM	BOP-Neutral	+/- 0 kg	+/- 0 L
	BOP-Advantage	-/- 50 kg	120 L

* Class and corresponding BOP is determined by Team composition (Drivers categories)

Please note: In case Class GT3-AM and GT3-PRO is combined to one Class GT3:

the BOP, GT3-AM-BOP or GT3-PRO-BOP is still applicable determined by Team composition (Drivers categories)

** BOP adjusted (+/-) ballast weight and refuelling amount, referred to initial value specified in Appendix 11 (See BOP-publication of the specific event)

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GT cars (Mainly GT cars, also American GT's are eligible)

Class GT3-Am & Class GT3-Pro

Brand & Type	Minimum Weight	Max Refuel amount	Restrictor	Remarks *
ASTON MARTIN V12 VANTAGE GT3	1280 kg	110 L	2x41,5mm	FIA-restrictor design
AUDI R8 LMS Ultra	1245 kg	110 L	2x47,2mm	up to and incl. 2014
AUDI R8 LMS GT3 (GT3-038) Evo 2018	1260 kg	100 L	2x39,0mm	Or AM-advantage only: 1310kg/2x40mm FIA-restrictor design
AUDI R8 LMS GT3 (GT3-038) Evo 2019	1270 kg	100 L	2x40,0mm	Or AM-advantage only: 1320kg/2x42mm FIA-restrictor design
BMW M6 GT3	1310	105 L	N/A	Max Pboost ratio/rpm 1,78/4000 1,86/4500 1,92/5000 1,94/5500 1,89/6000 1.73/6500 1,65/7000
CHEVROLET CORVETTE C6-ZR1	1200 kg	105 L	2x32,1mm	LMGTE-2-04
FERRARI 488 GT3	1300 kg	95 L	Max Pboost ratio/rpm 1,47/4000 1,51/4500 1,55/5000 1,59/5500 1,60/6000 1,57//6500 1,53/7000 1,48/>7250	Or AM-advantage only: 1350kg and Pmax 1,47/4000 1,51/4500 1,56/5000 1,60/5500 1,63/6000 1,59//6500 1,54/7000 1,49/>7250
LAMBORGHINI HURACAN GT3 Evo2018	1280 kg	100 L	2x39,0mm	FIA-restrictor design
LAMBORGHINI HURACAN GT3 Evo2019	1310 kg	100 L	2x39,0mm	FIA-restrictor design
McLaren MP4-12C GT3	1255 kg	115 L	2x36,0mm	Max Pboost ratio/rpm 1,82/4000 1,80/4500 1,78/5000 1,76/5000 1,72/6000 1,65//6500 1,59/7000 1,53/>7500
MERCEDES SLS AMG GT3	1330 kg	105 L	2x38,0mm	FIA-restrictor design
MERCEDES AMG GT3 (2019)	1330 kg	105 L	2x35,0mm	Or AM-advantage only: 1380kg/2x36mm FIA-restrictor design
MERCEDES AMG GT3 (EVO2020)	1330 kg	105 L	2x35,0mm	Or AM-advantage only: Or 1380kg/2x36mm FIA-restrictor design
NISSAN GT-R Nismo GT3 2018 (GT3-048)	1300 kg	110 L	N/A	Max Pboost ratio/rpm 2,00/4000 2,00/4500 2,00/5000 1,95/5500 1,95/6000 1.95/6500 1,90/6900 1,70/7000
PORSCHE 911 GT3 R (991 I & 991 II)	1240 kg	95 L	2x41,5mm	Or AM-advantage only: Or 1290kg/2x43mm FIA-restrictor design
RADICAL SPORTSCARS RXC TURBO GT3	Tba	Tba	Tba	Max Boost Tba
RENAULT SPORT RS01 Configuration BOP GT3	1200 kg	110L	Tba	Max Pboost ratio/rpm 1,95 (at all rpm) See also appendix Renault RS01 aerodynamics
SCG 003C	1280 kg	115 L	2x35,0mm	Max Pboost ratio/rpm 1,85 (at all rpm) (acc. Technical form SP-X 010 2018 & modified air-inlet)

* Values are boost pressure ratio and need to be multiplied by the ambient pressure to get the Pboost limit. Competitors must adjust boost pressure relative to ambient pressure at each event. Pboost limits linear interpolation approach.

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Class GTX Special GT cars

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	BOP	Remarks
Lamborghini Huracán Super Trofeo	5200 cc	1300 kg	110 L	2 x 40mm	Datalogger AIM Evo 4 or Evo5 mandatory
Lotus Exige V6 Cup R	3500 cc Turbo	1000 kg	120 L @ Green 120L @ Code60	Pboost: TBA	Datalogger AIM Evo 4 or Evo5 mandatory
MARC II V8	5200 cc	1150 kg	120 L	NA	NA
Mercedes AMG GTX	4000 cc Turbo	1350 kg	120 L	Max Pboost 2.4 bar	Datalogger AIM Evo 4 or Evo5 mandatory
Vortex Light V8	6200 cc	950 kg	120 L	NA	NA
BMW M3 F80	3000 cc Turbo	1300 kg	120 L @ Green 120L @ Code60	NA	NA
BMW M4 Silhouette	3400 cc	1050 kg	120L	NA	NA
KTM GTX Concept	2500 cc Turbo	1050 kg	100 L	2,3bar (independent of Pamb), max rpm 7000	Datalogger AIM Evo 4 or Evo5 mandatory

Please note: Art. 3.3 of Appendix 7 of the Sporting & Technical regulations

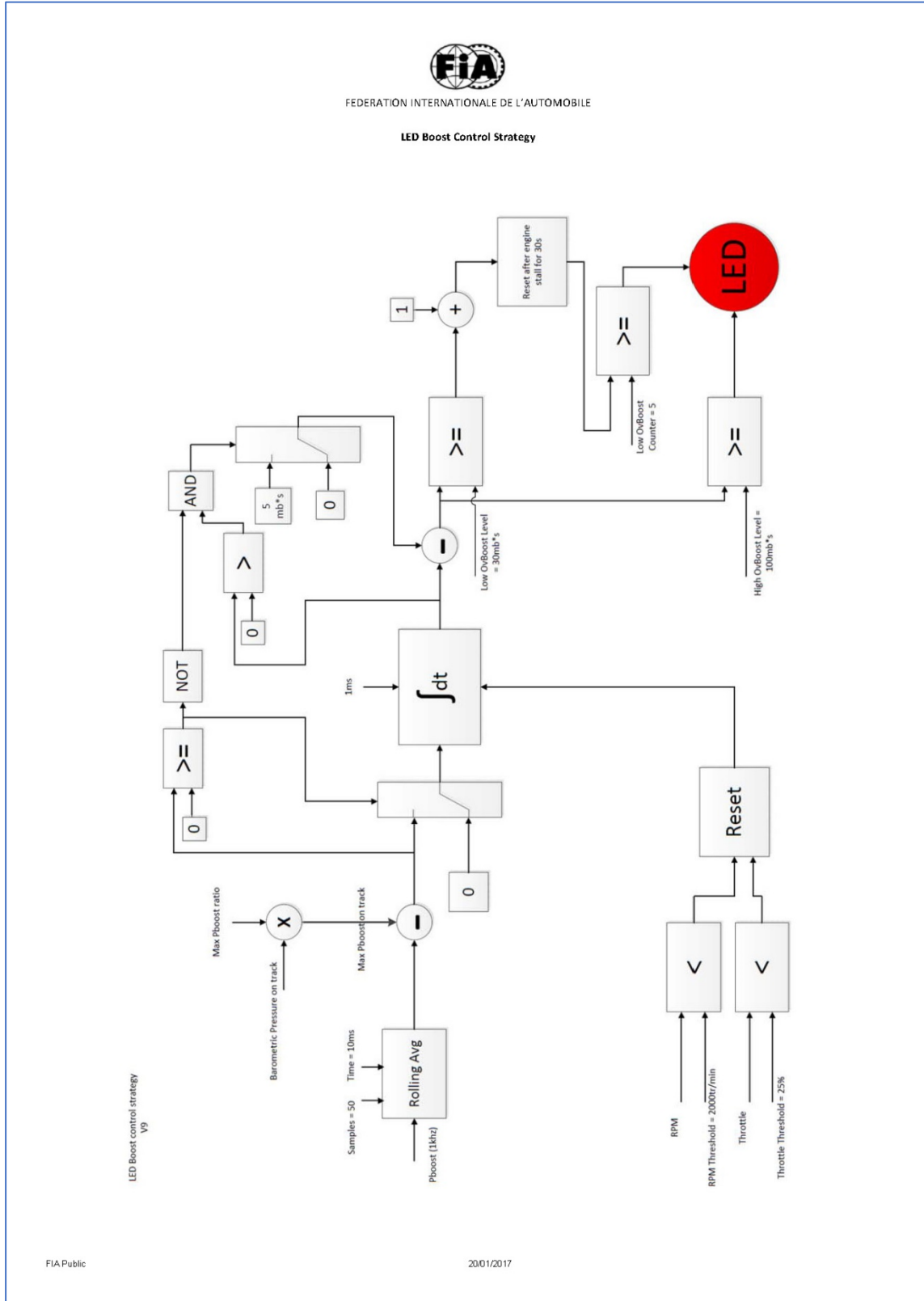
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Appendix: Control of Pboost strategy



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Appendix: Renault RS01 aerodynamics



PHOTO N° 01

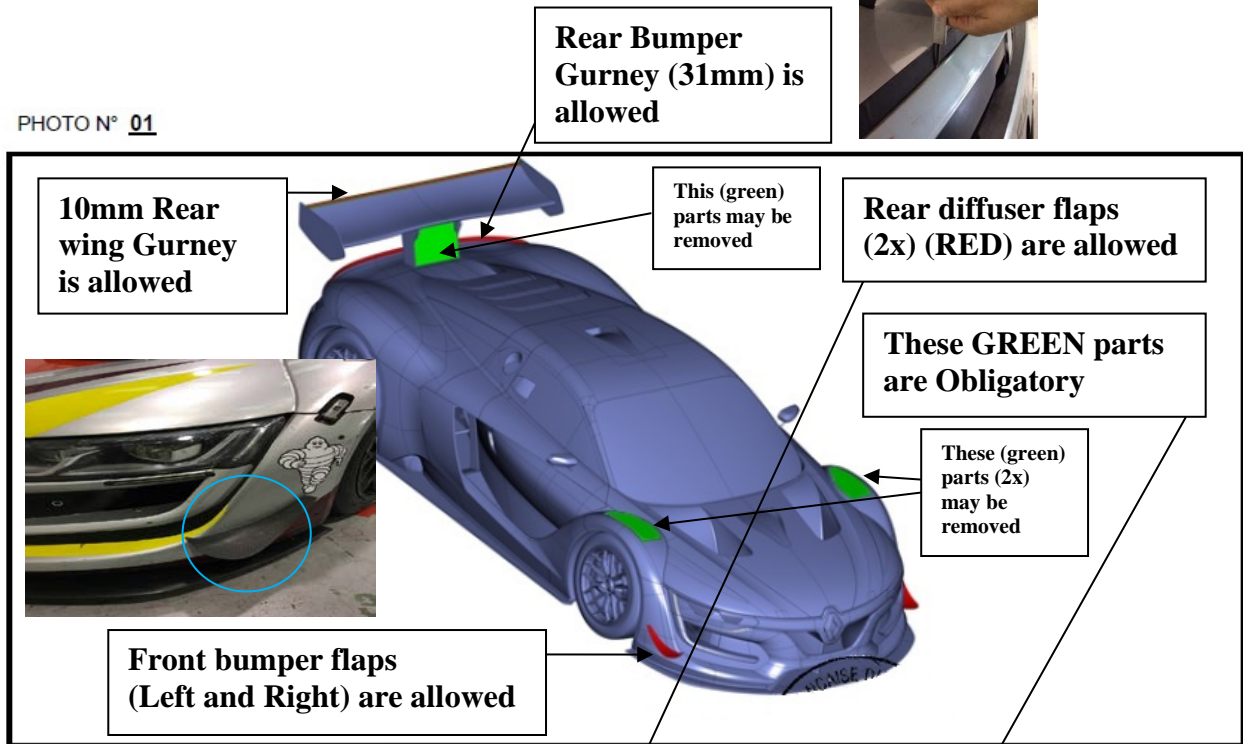


PHOTO N° 02

