



S5000

User Guide



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1 CUSTOMER SERVICE CONTACT

1.1 TECHNICAL SUPPORT

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1.2 GRM WORKSHOP

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2 OVERVIEW

2.1 GENERAL DIMENSIONS

Specific Dimensions (Refer to Homologation Document)				
Wheelbase	3090mm			
Front Track	2020mm MAX			
Rear Track	2020mm MAX			
Power	560hp Maximum			
Total Weight (Kerb no fuel)	850kg			
Fuel Tank Capacity	62L			

THE S5000 IS AN EXTREMELY HIGH-PERFORMANCE VEHICLE FIT FOR USE ONLY AT CONFEDERATION OF AUSTRALIAN MOTORSPORT LICENSED FACILITIES.

IT IS THE RESPONSIBILITY OF THE OPERATOR (THIS MAY OR MAY NOT BE THE DRIVER) TO ENSURE THE VEHICLE IS FIT FOR PURPOSE AND SAFE TO OPERATE.

ROGERS ENGINEERING AND DEVELOPMENT SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGE OR INJURY TO PERSONS OR PROPERTY THAT MIGHT BE CLAIMED AS A RESULT FROM THE OPERATION OF THE VEHICLE, INSTALLATION, IMPROPER INSTALLATION AND FAILURE OF PARTS INCLUDING CLAIMS FOR DELAY, LOSS OF PROFITS OR LABOUR. THERE ARE NO WARRANTIES EXPRESSED OR IMPLIED.



2.2 BASELINE SET-UP

This is a general Baseline Set-Up recommended by GRM. It is intended to be tuned track to track.

Geometry	/	Front	Rear
Ride Height*	[mm]	28	55
Camber	[deg]	-3	-1.6
Castor	[deg]	5.1	-
Тое	[mm]	1.5 OUT	1.5 IN
Anti-Dive ⁺	[%]	20	-
Anti-Lift ⁺	[%]	-	112
Anti-Squat ⁺	[%]	-	-1
Roll Centre ⁺	[mm]	71	80
Suspensio	n		
Springs	[lbs/in]	700	1200
Preload**	[Turns]	5	4
Bump Rubber ⁺	[Multimatic]	1x Blue	2x Red
Mandatory Packer ⁺	[mm]	15	7
Additional Packer	[mm]	10	0
Domnor	[LSR clicks]	-5	-5
Damper	[HSR sweeps]	+5	+5
ARB Setting	[hole;mm]	4	5
Aero			
Main Element	[deg]	-	4
Secondary	[set;deg]	E5	29.5

*Measured from the bottom surface of the Plank extended to each axle centreline (not including 5mm skid block). **0 Turns of preload is right at the point where the spring is no longer loose on a fully extended damper. *For information only, not adjustable



2.3 CHASSIS IDENTIFICATION

Each Tub has a Manufacturer identification plate bonded to the inside of the cockpit on the LHS of the steering wheel.



And a Constructor identification plate is also bonded to the inside of the cockpit on the RHS of the steering wheel.





3 CAR CHARACTERISTICS

3.1 A - ENGINE

3.1.1 GENERAL INFORMATION

Engine Information				
Туре	V8 Naturally Aspirated			
Capacity	5200 cm3			
Bore & Stroke	94 x 93 mm			
Maximum Speed	8000rpm			
Cooling System	Water without thermostat			
Fuel	Unleaded 98 RON			
Lubrication	Dry Sump			
Engine Management	Motec M150			

3.1.2 ENGINE POWER CURVE





3.1.3 ENGINE IDENTIFICATION





3.2 B - ENGINE SYSTEMS

3.2.1 COOLING SYSTEM

The car is equipped with two water radiators, one water/oil heat exchanger for the engine oil and a separate transmission cooling system with a single radiator. A mechanically driven water pump generates the circulation for the engine coolant.

The coolant capacity is approximately 14L including a maximum of 1.0L of Coolant concentrate, with the level set by bleeding the system.

While adding coolant mixture to the Header tank, bleed air firstly from the disconnected fitting at the top of the LH radiator.

Once air has finished escaping from the top of the LH radiator reconnect the fitting and then bleed air from the disconnected fitting at the top of the RH radiator.



Once air has finished escaping from the top of the RH radiator, reconnect the fitting and continue filling the system until the header tank/swirl pot is approximately $\frac{3}{4}$ full when engine is cold.



The maximum coolant temperature must not exceed 100°C.

3.2.2 OIL SYSTEM

The engine has a dry sump oil system with the oil tank located in the bell housing between the engine and the transmission. The oil level must be checked using Dipstick Part# GRM-AW0470-00 and the oil level maintained between the minimum and maximum indicators on the dipstick. The oil capacity at the maximum indicator mark is approximately 8.0L. Oil level must be kept above the minimum mark.

Oil Filter P/N: K&N HP-2010



Below 50°C engine oil temperature the engine management system limits the maximum engine speed to 2500rpm. The maximum oil temperature must not exceed 120°C.



3.2.3 INTAKE SYSTEM

The custom inlet manifold with individual butterfly throttles on each cylinder intake trumpet is enclosed within an air box fed through a K&N air filter. Care must be taken when the air filter is removed to not let anything 'fall into' the air box.

Air Filter P/N: K&N 33-2116

3.2.4 EXHAUST SYSTEM

The custom exhaust system consists of a pair of 4 into 1 exiting through a pair of rear mounted mufflers. It is important to ensure all mounts and heat shields are maintained and no contact occurs between the exhaust and any bodywork.

3.2.5 FUEL SYSTEM

The car is equipped with a 62L foam filled ballistic fuel bladder to FIA FT-3 specification housed within the carbon tub. A single electric high-pressure fuel pump located at the bottom of the fuel bladder feeds the engine through an internal pressure regulator.

The pressure regulator is set at 56psi. If the recorded fuel pressure is less than 45psi at any time during normal vehicle operation notify GRM Technical Support.

Filling of the fuel bladder must be done slowly through the dry break on the fill tube via an external off vehicle pump.

To drain the fuel, disconnect the dry break on the fuel line from the fuel tank top cover. While ensuring the safe containment of any exiting fuel, operate the high-pressure fuel pump using the fuel pump switch on the switch panel in the cockpit.



3.3 C - TRANSMISSION

3.3.1 CLUTCH

The car is fitted with a Tilton Carbon/Carbon Clutch.

Information				
Туре	Carbon/Carbon			
Make	Tilton			
Clutch bearing	Hydraulic			
Master Cylinder	Tilton 0.75″			
Fluid	Valvoline VR1			

Between the clutch master cylinder and the clutch is a valve mounted on the tub inside the cockpit. LEAVE AT THE FACTORY SETTING – FULLY OPEN.

The clutch activation point is to be set between 6 and 7mm off the clutch pedal stop on the pedal box. The setting procedure is as follows:

- Fully depress the clutch pedal until the clutch stop is engaged.
- Release the clutch pedal until the rear wheels can just not be turned.
- Measure from the clutch stop to the bolt on the clutch pedal.
- Repeat this process.
- Ensure both measurements are between 6 & 7mm.
- If this measurement cannot be achieved the clutch must be inspected and re-shimmed as necessary.
- During engine run up there is a Dash page to check clutch activation.

3.3.2 TRANSMISSION

The car is fitted with a Holinger MFT-S5000 gearbox incorporating rear suspension pickups, integral bell housing with engine oil tank, limited slip differential and pneumatic paddle gear selection.

A set of drop gears sit between the engine and the gearbox. This pair of gears are in their own oil chamber, separate from the gearbox, and require INDEPENDENT filling and draining.

The gearbox and the differential are sealed.

The gear diagram is below.





3.3.3 LUBRICATION

The gearbox has an integral oil pump and filter and an external radiator for cooling the oil. The filter cartridge O-Ring is 65x2.5 NBR and the filter is a Ryco 2605P.

The gearbox is filled via the access cap on top of the unit.



The oil level is set to the bottom of the RH level plug.



When filled from dry, and after the first transmission run up, the oil level will need to be topped up to the correct fill level. The capacity is approximately 3.5L.

The drop gear oil level is INDEPENDENT OF THE GEARBOX and is filled through the temperature sensor hole.



The oil level is to the bottom of this fill hole and the oil capacity is approximately 0.5L.

The transmission should be above 60° C before it is operated in racing conditions. The maximum oil temperature must not exceed 130°C at the drop gears and 120°C at the gearbox. If these maximum temperatures are reached or exceeded, at a minimum the oil must be changed.

3.3.4 PNEUMATIC GEAR SELECTION SYSTEM

The car is equipped with a pneumatic gear selection system operated by two paddles on the steering wheel. To select a higher gear, the RH paddle is operated, to select a lower gear, the LH paddle is operated.

There is a pneumatic compressor located in the RH side pod, with an air accumulator/tank located between the cylinder heads on the engine. The gear selection barrel in the gearbox is operated by externally mounted Pneumatic Solenoid Valves.

The Ignition switch must be 'On' to allow gear selection.

The Pneumatic Solenoid Valves remain maintenance free. Please avoid removing the Solenoid Values, opening the air line between the Solenoid Block and air tank/compressor as any dust or foreign objects in the system will reduce performance.

If any pneumatic gear selection issues occur refer to GRM Technical Support. If any maintenance work is to be carried out, the system must be depressurised before commencing. This is achieved by operating the Pressure Relief Valve at the air tank.

At the end of each day, please depressurise the system using the Pressure Relief Valve at the air tank. This will reduce the stress on the components when not in use.

3.3.5 DIFFERENTIAL

The Holinger MFT-S5000 transmission is fitted with a conventional ramp activated multi-plate clutch limited slip differential.

There is no preload on the friction faces.

The differential is non-adjustable and is sealed in the transmission.

3.3.6 DRIVESHAFT

The driveshaft M10 mounting bolts are to be tightened to 50ftlbs WITHOUT Loctite.

Please ensure that the driveshafts are mounted in a consistent direction over their lifetime. This will reduce the stress in the shaft and prolong mileage.



3.4 D - WARM UP PROCEDURE

For the first engine run after an Engine, ECU, Throttle Pedal Sensor replacement, or any adjustments made to the pedal box please contact GRM technical support as the following cannot be done by the customer:

- Change ECU parameters
- Calibrating the throttle pedal sensor
- Calibrating the throttle servo

CAUTION - When the engine is not running, the starter motor will function when the vehicle is in Gear.

This warmup procedure must be done while the car is safely isolated and secured with its rear wheels off the ground.

Engine crank procedure to prime the oil pressure

- Connect Auxiliary Battery
- Master Switch On, Ignition Off
- Ensure Neutral is selected
- Press and maintain the Start button until some engine oil pressure is present
- Once oil pressure is established the engine is ready to run

This procedure needs to be carried out after an oil change, or after the engine has not run for more than four hours.

Running the engine

- Auxiliary Battery connected
- Master Switch On, Ignition Off
- Ensure Neutral is selected
- Ignition On
- Ensure fuel pressure is present on ignition activation
- Press the Start Button
- Check the coolant level in the header tank/swirl pot (approximately ¾ full when engine is cold)
- Ensure there are no fluid or air leaks
- During the first engine run of the day the gearbox must be run through all gears
- With the engine running, to exit neutral, the clutch must be depressed
- With the engine running, to select reverse, while in neutral the down paddle must be active for 2 seconds
- Warm the engine until the water temperature reaches 90°C

Checks

After the engine warm up:

- Check the engine oil level on the dipstick before oil drains back into the sump
- Check the gearbox and drop gear oil levels
- Ensure there are no fluid leaks
- Download and check the data from the warmup
- Disconnect the Auxiliary Battery before driving the vehicle



3.5 F - FRONT AND REAR SUSPENSION

3.5.1 OVERVIEW

The S5000 has unequal length double wishbone front suspension with coil over dampers and adjustable anti-roll bar actuated by a pushrod and rocker mechanism. Steering is achieved through a non-power assisted rack and steering arms controlling the toe angle.



The rear suspension of the S5000 is unequal length double wishbone with an upper toe link to control toe angle. As with the front suspension, the rear coil over dampers and adjustable anti-roll bar are actuated by a pushrod and rocker mechanism.



There is only a single spring and damper per wheel, there is no third element or interconnection between front and rear suspensions. In addition to the coil over spring, each damper has a bump rubber and packer system.



3.5.2 SET-UP ADJUSTMENTS

Effects of the adjustments on the car's set-up.

			Front	Rear
Dido Lloight	Duchrod adjustor	mm/turn	5.55	5.75
Ride Height	Pusifiou aujuster	mm/flat	0.92	0.95
Spring		Thread step [mm]	1.41	1.41
Preload	Spring platform	Ride Height change* [mm/turn]	1.57	1.95
Camber	Shim	deg/mm	0.269	0.197
Tao	Steering arm/toe link	mm/flat	1.71	0.90
Toe	adjuster	deg/flat	0.26	0.14
Castor	Lower wishbone rod end	deg/turn		
Mation Datio		Wheel/Spring	1.115	1.38
MOLION Ratio		Wheel/ARB	1.533	1.015

*No Ride Height change when car is already in full droop

3.5.3 FRONT SUSPENSION GEOMETRY ADJUSTMENT

Camber adjustment for the front suspension is achieved by adjusting the thickness of the shims (in purple) on the upright as illustrated in the picture below and overall dimensions of the bottom wishbone.





3.5.4 FRONT ANTI-ROLL BAR

The front anti-roll bar is actuated by movement of each front upright via a pair of pushrods, rockers and drop links.

A single front anti-roll bar is specified. The stiffness can be adjusted by changing the connection position of the two drop links.



				Front ARB ra	ate		
Position*	1	2	3	4	5	6	7
N/mm	99	111	126	143	165	191	225

*FARB hole settings start at the top hole being position 1 and increasing in number/rate as the adjuster is moved down.





3.5.5 FRONT SPRING

Three sets of front springs used in a coil-over configuration are available.

Front Springs				
Reference	Stiffness			
GRM-CE0037	600 lbs/in			
GRM-CE0038	700 lbs/in			
GRM-CE0039	800 lbs/in			

The following packers can be used to tune the overall solid packer set.

Optional Solid Packer			
Reference	Thickness		
GRM-AF0487	1mm		
GRM-AF0488	2mm		

The front bump rubber and packer system is shown in the following picture.



	Front Bump Rubber rate							
Disp. [mm]	0	1	2	3	4	5	6	7
1xBLUE [N/mm]	0.0	9.8	29.4	50.4	61.1	71.8	89.4	140.1





3.5.6 REAR SUSPENSION GEOMETRY ADJUSTMENT

Camber adjustment for the rear suspension is achieved by adjusting the thickness of the shims on the upright (in purple) as illustrated in the picture below and overall dimensions of the top and bottom wishbones.



3.5.7 REAR ANTI-ROLL BAR

The rear anti-roll bar is actuated by movement of each rear upright via a pair of pushrods, rockers and drop links.

A single rear anti-roll bar is specified. The stiffness can be adjusted by changing the connection position of the two drop links.





	Rear ARB rate						
mm*	0	5	10	15	20	25	
N/mm	103	119	140	167	202	249	

*An 'X'mm RARB setting is offset 'X' mm inwards from having the adjuster flush with the end of the T-Bar.





3.5.8 REAR SPRING

Three sets of rear springs used in a coil-over configuration are available.

Rear Springs					
Reference	Stiffness				
GRM-CE0040	1000 lbs/in				
GRM-CE0041	1100 lbs/in				
GRM-CE0042	1200 lbs/in				

The following packers can be used to tune the overall solid packer set.

Optional Solid Packer					
Reference	Thickness				
GRM-AF0487	1mm				
GRM-AF0488	2mm				

The rear bump rubber and packer system is shown in the following picture.



	Rear Bump Rubber rate							
Disp. [mm]	0	1	2	3	4	5	6	7
2xRED (series) [N/mm]	0.0	3.9	8.6	9.2	14.2	21.6	28.9	42.0







3.5.9 FRONT AND REAR DAMPERS

The S5000 is fitted with a pair of JRi dampers at each axle. Front and rear are identical. Only rebound, highand low-speed, is adjustable.



High-Speed Adjuster

The high-speed adjuster is a "sweep" style adjuster, meaning that its adjustment is measured by the location of the adjuster in the eyelet window. It uses left-hand thread in its operation which means; as you increase high-speed, the adjuster will move down in the window (The low-speed adjustment does not change when adjusting the high-speed). The high-speed adjuster's reference position is full soft and referred to as +0 (+0=full soft, +10=full stiff).



Low-Speed Adjuster

The low-speed adjuster is a "clicker" style adjuster, meaning that its adjustment is measured by detent grooves located inside the high-speed shaft. It uses a right-hand thread in its operation which means; as you increase low-speed, the adjuster will move up in the window. The low-speed adjuster's reference position is full stiff and referred to -0 (-0=full stiff, -25=full soft).





3.6 G - STEERING

The S5000 is fitted with a non-power assisted rack actuated by a steering column with a quick release coupling for the steering wheel.

An integral sensor measures the steering angle. The ratio of turns of the column to displacement of the rack is 36.8mm/turn.

There are 1.52 turns lock to lock of the steering wheel.

The steering angle sensor is calibrated and zeroed during the pre delivery checks. This cannot be changed by the customer, therefore if the rack has been replaced or reinstalled please contact GRM technical support to get it recalibrated.

3.7 H - BRAKING

3.7.1 BRAKE SYSTEMS

The S5000 is fitted with AP Racing Rotors and Calipers, these are the same front and rear.

	Front	Rear
Caliper – LH	CP9440-3S4L	CP9440-3S4L
Caliper – RH	CP9440-2S4L	CP9440-2S4L
Rotor – LH	CP3580-2573 G4	CP3580-2573 G4
Rotor – RH	CP3580-2572 G4	CP3580-2572 G4
Pads	PFC11	PFC11

The wear of all brake components must be closely monitored and replaced when necessary.



3.7.2 BRAKE ACTUATION

The S5000 is fitted with a Tilton Pedal Box. The position of this can be adjusted backwards and forwards depending on the driver preference. The pedal box includes the throttle pedal and sensor, hydraulic clutch circuit actuation and front and rear brake circuit actuation with a driver adjustable brake balance bar.

The hydraulic circuit actuation details are given below.

Function	Dimension	Reference
Front Brake	0.8125″	Tilton
Rear Brake	0.8750″	Tilton
Clutch	0.7500″	Tilton
Fluids		Valvoline VR1

The reservoirs for the master cylinders are mounted to the front bulkhead of the carbon tub. Appropriate fluid levels must be maintained in all circuits. Ensure all hydraulic circuits are properly bled of all air prior to vehicle operation.





3.8 I - WHEELS AND TYRES

3.8.1 WHEELS

The S5000 has 15x10'' front wheels and 15x15'' rear wheels. It is important to ensure the integrity and safety of all wheels fitted to the car.

We recommend regular replacement of the rubber Schrader valves in the wheels.

3.8.2 WHEEL NUTS

A single wheel nut is used to attach the wheels to each axle. This must be tightened to 540 ftlbs using the 1" drive wheel socket supplied with the car. A lubricant must be applied to the taper on both the nut and the wheel. Use of Kluber MOLYBKOMBIN UMF T4 Spray is recommended, this is a dry lubricant. Anti-Seize should also be applied to the thread, usually this is applied to the spindle thread prior to each session.

3.8.3 TYRES

The tyres used on the S5000 are from Hoosier. The integrity and safety of all tyres fitted to the car must be checked before vehicle operation.

	Front	Rear
Wheel	15x10″	15x15″
Slick – Size	23.0x9.5R15 5000	27.0x14.0R15 5000
Slick – Code	43574	43594
Rain – Size	23.0x9.5R15 W3	27.0x14.0R15 W3
Rain – Code	44195	44517

Hoosier's recommendations are:

	Front	Rear		
Pressure	20-22 hot	24-26 hot		
Temp Target	82-104°C (up to 115°C can be tolerated)			
Temp Spread	Range of 8-14°C (with inside being hotter)			
Camber	3-4 neg	1-2 neg		

The tyre spring rates are:

Slick Front (43574)						
Pressure	23psi	25psi	27psi			
1050lbs (476kg)	1650 lbs/in	1655 lbs/in	1810 lbs/in			
850lbs (386kg)	1590 lbs/in	1605 lbs/in	1760 lbs/in			
650lbs (295kg)	1550 lbs/in	1565 lbs/in	1720 lbs/in			



Slick Rear (43594)						
Pressure	23psi	25psi	27psi			
1050lbs (476kg)	1795 lbs/in	1855 lbs/in	1995 lbs/in			
850lbs (386kg)	1745 lbs/in	1795 lbs/in	1935 lbs/in			
650lbs (295kg)	1675 lbs/in	1715 lbs/in	1850 lbs/in			

Wet Front (44195)					
Pressure	23psi	25psi	27psi		
1050lbs (476kg)	1440 lbs/in	1525 lbs/in	1645 lbs/in		
850lbs (386kg)	1405 lbs/in	1490 lbs/in	1605 lbs/in		
650lbs (295kg)	1345 lbs/in	1435 lbs/in	1545 lbs/in		

Wet Rear (44517)			
Pressure	23psi	25psi	27psi
1050lbs (476kg)	1755 lbs/in	1845 lbs/in	1935 lbs/in
850lbs (386kg)	1700 lbs/in	1785 lbs/in	1870 lbs/in
650lbs (295kg)	1620 lbs/in	1705 lbs/in	1790 lbs/in



3.9 J - AERODYNAMIC

3.9.1 FRONT WING

Front Wing holes are labelled LETTERS for ROWS, and NUMBERS for COLUMNS (e.g. 'E1' is the forwardmost hole in the top row).



3.9.2 REAR WING

Rear Wing angles are zeroed to the flat surfaces either side of the Main Roll Hoop (near the rearward mounts of the halo).





Upper Rear wing adjustment and measurement



Lower Rear wing adjustment and measurement





4 ELECTRICAL SYSTEM

4.1 OVERVIEW

The electrical system is comprised of a 12V power circuit which includes an alternator, battery and master relay. The Motec control systems are as follows:

	MODEL	LOCATION	
ECU	M150	Under driver's seat	
PDM	PDM15	Under driver's seat	
DASH	D153	Steering Wheel	
SHIFT LIGHTS	SLM	Steering Wheel	
GPS	GPS-L10	Roll Hoop	
CAMERA	V2	Roll Hoop	
LOGGER	L120	LH Sidepod	
LAMBDA	LTCD	Rear of Airbox	

All systems are locked and must not be modified. Users can download the L120 datalogger and set a reference lap time. The software required for these functions is Motec C125 Dash Manager V6.10H9.

It is assumed that the customer is familiar with the use of Motec Dash Manager and Motec i2 Pro. Please contact GRM Technical Support if help is required.

4.2 POWER CIRCUIT

The Ford Performance alternator is located on the left-hand side of the engine and is connected to a Varley Red Top 15 battery located under and behind the driver's seat. The master relay, also located under the driver's seat, is activated by the Master Switch on the Dash Panel, or in Emergencies only, a Kill switch on the roll hoop.

CAUTION – The emergency Kill Switch on the roll hoop deactivates the electrical system AND ACTIVATES THE FIRE EXTINGUISHER AT THE SAME TIME.

A schematic of the power circuit is shown below.





An Anderson Jump plug is located in the left-hand side pod for connection of an auxiliary battery. It is recommended an auxiliary battery is connected at all times the car is turned on without the engine running.

CAUTION – Always disconnect the auxiliary battery before driving the car. And be aware the auxiliary battery connection is ALWAYS LIVE - it is directly connected to the battery.

4.3 FIRE EXTINGUISHER

The car is equipped with a Lifeline Fire Extinguisher system. The pressurised tank containing the retardant is located under and behind the driver's seat, with the Power Pack mounted on the right-hand side of the cockpit beside the driver. It is important all manufacturer's instructions are followed at all times and electrical function is regularly checked.

NOTE – Always activate the system before the car is driven by placing the switch on the Power Pack in the ARMED position.

If the switch on the power pack is pulled against the spring towards the AMBER LED and the AMBER LED does NOT illuminate or immediately goes out the battery needs replacing. Only use a battery recommended by Lifeline. If the switch on the power pack is placed in the centre position, activation of either the fire button or the emergency kill switch should illuminate the GREEN LED. If the GREEN LED is illuminated BEFORE activating either fire button the system is LIVE and the switch should NOT be put in the armed position. If the GREEN LED does not illuminate or is permanently illuminated in this central switch position, there is a fault which must be rectified before the car is driven.



4.4 RADIO CONNECTIONS

The main electrical harness in the s5000 is equipped with radio connections to avoid having to piggy back additional radio looms. The customer needs to provide an adapter loom from the autosport connector to their handheld radio that matches the pinout given below.

4.4.1 RADIO TO CAR CONNECTION

- AS6 07-35 PN Located on a panel on the right-hand side of the cockpit next to the Driver
 - 1. MIC NEG (GND)
 - 2. PTT +ve
 - 3. PTT -ve
 - 4. MIC POS (EMC)
 - 5. SPEAKER POS (SP+)
 - 6. SPEAKER NEG (SP-)

4.4.2 HELMET TO CAR CONNECTION

- Nexus 4 pole Male Located next to the right-hand shoulder belt fixing
 - 1. MIC NEG (GND)
 - 2. SPEAKER NEG (SP-)
 - 3. MIC POS (EMC)
 - 4. SPEAKER POS (SP+)



5 ELECTRONICS

5.1 USER INTERFACE

5.1.1 STEERING WHEEL

CAUTION - When removing the steering wheel, care must be taken to ensure the long term reliability of the electrical connection between the chassis and the steering wheel. THIS CONNECTION IS CRITICAL TO THE VIABLE OPERATION OF THE VEHICLE.





5.1.2 CONTROL PANEL



Pump Fuel Out: Push to activate Fuel Pump

Push again to turn Fuel Pump off

- TRIP 1 Reset: Push to reset the Trip Distance and Total Fuel Used values
- BRAKE BIAS: Clockwise rotation provides more FRONT braking

LOGGER DOWNLOAD: Connection to the Motec L120 Datalogger



5.1.3 DASHBOARD

Dashboard Pages:

There are 5 pages available on the Display. The Default display on power up is the 'Driver' page; the remaining 4 pages are displayed on successive pushes of the Scroll button on the steering wheel.

All pressures are shown in PSI.

DRIVER PAGE:



BRAKE BIAS PAGE:



A number greater than 50% means more front brake bias



ENGINE RUN UP PAGE:



INFORMATION PAGE:



Name	Description	
Loaded Ref Lap	The currently loaded reference lap in seconds	
Fuel Used	Fuel Used counter 1 (reset by holding Alarm button for 3s)	
Total Fuel Used	Fuel Used counter 2 (reset by holding Trip 1 Reset button)	
Trip Dist	Trip Distance (reset by holding Trip 1 Reset button)	
Odometer Total mileage of vehicle		



SETUP PAGE:



Name	Description	
Gear Pos	If the gear position sensor has been moved, then adjust while the trans is in neutral until the marker is between the white lines closest to 'N'.	
	Then cycle the transmission through all gears and ensure that the correct gear is displayed.	
Throttle	Should display 0.0 when throttle is released. Avoid adjusting throttle position sensor without GRM technical support.	
Steering Displays steering angle. Contact GRM Technical support recalibration.		
Clutch When clutch is depressed ensure marker goes beyond white not, check clutch height as described earlier.		

5.1.4 DASH ALARMS

Message	Condition	
OIL PRESSURE	Oil Pressure <72psi with RPM>5000 OR Oil Pressure <25psi with 900 <rpm>5000</rpm>	
ENGINE HOT	Water Temperature>100 with RPM>1000 OR Oil Temperature>120	
TRANS HOT	Transmission Temp>120 with RPM>1000 OR Drop Gear Temp>140 with RPM>1000	
FUEL PRESSURE	Fuel Pressure<43.5psi with RPM>3000	
BATT VOLTS	Volts<11 with engine not in cracking state	
FUEL RESET	Displays to confirm fuel used has been reset	
TRIP RESET	Displays to confirm total fuel used and trip distance has been reset	



6 DATA LOGGER

6.1 CHANNEL LIST

Channel Name	Comment	Unit	Sample Rate [Hz]
Ambient Pressure	Ambient pressure	kPa	10
Bat Volts PDM	Battery voltage	V	20
Beacon	Beacon signal		1
Brake Bias Setting	Brake balance setting	%	20
Brake Pressure Front	Brake pressure front	psi	100
Brake Pressure Rear	Brake pressure rear	psi	100
Clutch Pressure	Clutch pressure	psi	20
Coolant Pressure	Water system pressure	psi	10
Coolant Temperature	Water system temperature	°C	10
Display Page	Steering wheel display page number		10
Drop Gear Temp	Drop Gear temperature	°C	1
Engine Oil Pressure	Engine oil pressure	psi	10
Engine Oil Temperature	Engine oil temperature	°C	10
Engine Speed	Engine speed	rpm	100
Exhaust Lambda Bank 1	Exhaust Lambda left-hand	LA	50
Exhaust Lambda Bank 2	Exhaust Lambda right-hand	LA	50
Fuel Pressure Sensor	Fuel pressure	psi	10
Fuel Temperature	Fuel temperature	°C	10
Fuel Used	Used fuel	I	1
G Force Lat	Lateral g-force	G	50
G Force Long	Longitudinal g-force	G	50
G Force Vert	Vertical g-force	G	50
Gear	Selected gear		10
Gear Sensor Voltage	Gear potentiometer voltage	V	100
Gear Shift Actu Pressure	Shift compressor pressure	psi	1
GPS Altitude	Altitude	m	20
GPS Date	Date		1
Ground Speed	Car travel speed	km/h	20
Inlet Air Temperature	Inlet air temperature	°C	10
Inlet Manifold Pressure	Inlet manifold pressure	kPa	10
Lap Distance	Lap distance	m	1
Lap Time	Lap time	S	1
Odometer	Odometer	km	1
PDM Fault Flag	Global channel error		10
PDM Input 1 Voltage	Master switch	V	10
PDM Input 2 Voltage	Fuel pump control ECU	V	10
PDM Input 5 Voltage	Shift compressor control ECU	V	10
PDM Output 1 Current	Fuel pump	Α	10
PDM Output 1 Status	Fuel pump		10
PDM Output 2 Current	Shift compressor 1	Α	10
PDM Output 2 Status	Shift compressor 1		10
PDM Output 3 Current	Shift compressor 2	Α	10
PDM Output 3 Status	Shift compressor 2		10
PDM Output 4 Current	Starter motor	Α	10
PDM Output 4 Status	Starter motor		10
PDM Output 5 Current	Ignition coils	Α	10
PDM Output 5 Status	Ignition coils		10
PDM Output 6 Current	Injectors/Cams	Α	10
PDM Output 6 Status	Injectors/Cams		10
PDM Output 10 Current	Shift solenoids	Α	10
PDM Output 10 Status	Shift solenoids		10
PDM Output 11 Current	LTCD (Lambda CAN Modul)	Α	10



Channel Name	Comment	Unit	Sample Rate [Hz]
PDM Output 11 Status	LTCD (Lambda CAN Modul)		10
PDM Output 12 Current	Logger/Camera	А	10
PDM Output 12 Status	Logger/Camera		10
PDM Output 13 Current	Dash/SLM/Keypad	А	10
PDM Output 13 Status	Dash/SLM/Keypad		10
PDM Output 14 Current	Rain light	А	10
PDM Output 14 Status	Rain light		10
PDM Output 15 Current	ECU	Α	10
PDM Output 15 Status	ECU		10
Throttle Pedal	Throttle pedal position	%	20
Throttle Position	Butterfly position	%	20
Total Fuel Used	Total fuel used	I	1
Transmission Temperature	Gearbox temperature	°C	10
Trip Distance	Trip distance	km	1
Wheel Speed FL	Wheel speed front left	km/h	100
Wheel Speed FR	Wheel speed front right	km/h	100
Wheel Speed RL	Wheel speed rear left	km/h	100
Wheel Speed RR	Wheel speed rear right	km/h	100
Alarm Bat Volts Lo	Alarm battery voltage low		10
Alarm Eng Oil Pres Lo	Alarm engine oil pressure low		10
Alarm Eng Temp Hi	Alarm engine temperature high		10
Alarm Gbox Oil Temp Hi	Alarm gearbox oil temperature high		10
BAlarmAcknowledgeButtonFromD1	Steering wheel acknowledge button		10
BPageButtonFromD1	Steering wheel page scroll button		10
Driver Switch 1	Steering wheel pit limit button		10
Driver Switch 2	Down shift paddle actuated		10
Driver Switch 3	Up shift paddle actuated		10
Driver Switch 4	Ignition switch		10
Gear Paddle Down Switch	Down shift paddle actuated		10
Gear Paddle Up Switch	Up shift paddle actuated		10
PDM Input 1 State	Master switch		10
PDM Input 2 State	Fuel pump control ECU		10
PDM Input 5 State	Shift compressor control ECU		10
Up Shift Light 1	Up shift light 1		100
Up Shift Light 2	Up shift light 2		100
Up Shift Light 3	Up shift light 3		100
Up Shift Light 4	Up shift light 4		100
Warning Light	Steering wheel display alarm		1

7 FLUIDS

Description	Quality	Quantity
Engine Oil	Valvoline ProV 20W-50	≈8L (dipstick)
Engine Coolant	Valvoline G-05 Zerex concentrate	≈14L (Coolant/water=1/13)
Fuel	98RON	62L tank capacity
Brake/Clutch Fluid	Valvoline VR1	
Gearbox Oil	Valvoline SynGear 75W-140	\approx 3.5L (fill level plug)
Drop Gear Oil	Valvoline SynGear 75W-140	≈0.5L (fill level plug)
Driveshaft Grease	NEO HPCC-1 CV	TBC
Pneumatic Valve Grease	Loctite LB8801 Silicone lubricant	ТВС



8 CAR MAINTENANCE

Description	Check	Change	Information		
Engine	[Engine			
Engine		tDC			
Alternator		the			
Alternator	Fach	LDC			
Accessory Belt	event	Depending visual state			
Radiator	Each event	Depending visual state	Flush coolant water		
Engine Oil and Filter		500 km	Oil Filter P/N: K&N HP-2010		
Fuel Filter		tbc			
Fuel Pump		tbc			
Spark Plug/Coils		tbc			
Flywheel			Visual inspection at each disassembly of clutch		
Air Filter	Each event	Depending visual state	Clean with specific K&N products Air Filter P/N: K&N 33-2116		
		Transmission			
Clutch	1500 km		Record wear, service if necessary		
Gearbox Oil and Filter		1000 km or Temp > 120 °C	When new after first 200 km		
Drop Gear Oil		Each event or Temp > 130 °C			
Driveshaft					
	-	Front and Rear Axle			
Wheel bearing	Each event	tbc	Check for play		
Wheel nut	Each event		Clean and dry lubricate		
Brakes					
Master Cylinder		6 months	Service and replace seals		
Caliper	Each event	Temp intermittently > 220 °C	Service and replace seals		
Disc	Each event	Depending visual state/wear	Check for excessive heat crazing and cracking		
Pad	Each session	Depending wear			

9 THIGHTENINGS

Please find all tightening torques including Loctite applications in the S5000 Parts Catalogue supplied by GRM.