



**iRacing**



# **BMW M HYBRID V8**

**USER MANUAL**





# Table of Contents

CLICK TO VIEW A SECTION

GENERAL INFORMATION	
A Message From iRacing »	4
Tech Specs »	5
Introduction »	6
Getting Started »	6
Loading An iRacing Setup »	7
Dash Pages »	8
ADVANCED SETUP OPTIONS	
Tires & Aero »	10
Tire Settings »	10
Aero Settings»	11
Aero Calculator»	11
Chassis »	13
Front »	13
Front Corners »	15
Rear Corners »	17
Rear »	20
Brakes/Drive Unit »	23
Brake Spec »	23
Hybrid Config »	24

Fuel »	25
Traction Control »	25
Gear Ratios »	26
Rear Diff Spec »	26



Dear iRacing User,

BMW's long-awaited return to the highest ranks of prototype racing comes in 2023, as the German manufacturer teams up with chassis partner Dallara and team partner Rahal Letterman Lanigan Racing to bring the BMW M Hybrid V8 to the IMSA WeatherTech SportsCar Championship. Built to a new set of global prototype regulations, two M Hybrid V8s will compete in IMSA's premier GTP class, but countless more reproductions of the car are set to debut on iRacing before its first racing lap.

Years of coordinated efforts in both North America and Europe to create a unified top-level rule set have allowed top-tier manufacturers to return to the prototype ranks, with BMW becoming one of the first to announce its involvement. The M Hybrid V8 produces approximately 640 horsepower out of its four-liter power plant alone, with its electric motor able to add even more boost.

The following guide explains how to get the most out of your new car, from how to adjust its settings off of the track to what you'll see inside of the cockpit while driving. We hope that you'll find it useful in getting up to speed.

Thanks again for your purchase, and we'll see you on the track!







# CHASSIS

PUSHROD-ACTUATED INDEPENDENT TORSION BAR FRONT AND REAR SUSPENSION WITH FRONT HEAVE AND REAR THIRD-SPRING ELEMENTS



LENGTH  
**5100 mm**  
201 in

WIDTH  
**2000 mm**  
78.74 in

WHEELBASE  
**3148 mm**  
124 in

DRY WEIGHT  
**1113 kg**  
2453 lbs

WET WEIGHT  
WITH DRIVER  
**1152 kg**  
2539 lbs

# POWERED UNIT



CAST ALUMINUM V8 WITH HYBRID MGU-K RECOVERY SYSTEM

DISPLACEMENT  
**4.0 Liters**  
244 cid

TORQUE  
**480 lb-ft**  
650 Nm

POWER  
**640 bhp**  
477 kW

RPM LIMIT  
**8200**



# Introduction

The information found in this guide is intended to provide a deeper understanding of the chassis setup adjustments available in the garage, so that you may use the garage to tune the chassis setup to your preference.

Before diving into chassis adjustments, though, it is best to become familiar with the car and track. To that end, we have provided baseline setups for each track commonly raced by these cars. To access the baseline setups, simply open the Garage, click iRacing Setups, and select the appropriate setup for your track of choice. If you are driving a track for which a dedicated baseline setup is not included, you may select a setup for a similar track to use as your baseline. After you have selected an appropriate setup, get on track and focus on making smooth and consistent laps, identifying the proper racing line and experiencing tire wear and handling trends over a number of laps.

Once you are confident that you are nearing your driving potential with the included baseline setups, read on to begin tuning the car to your handling preferences.

## GETTING STARTED

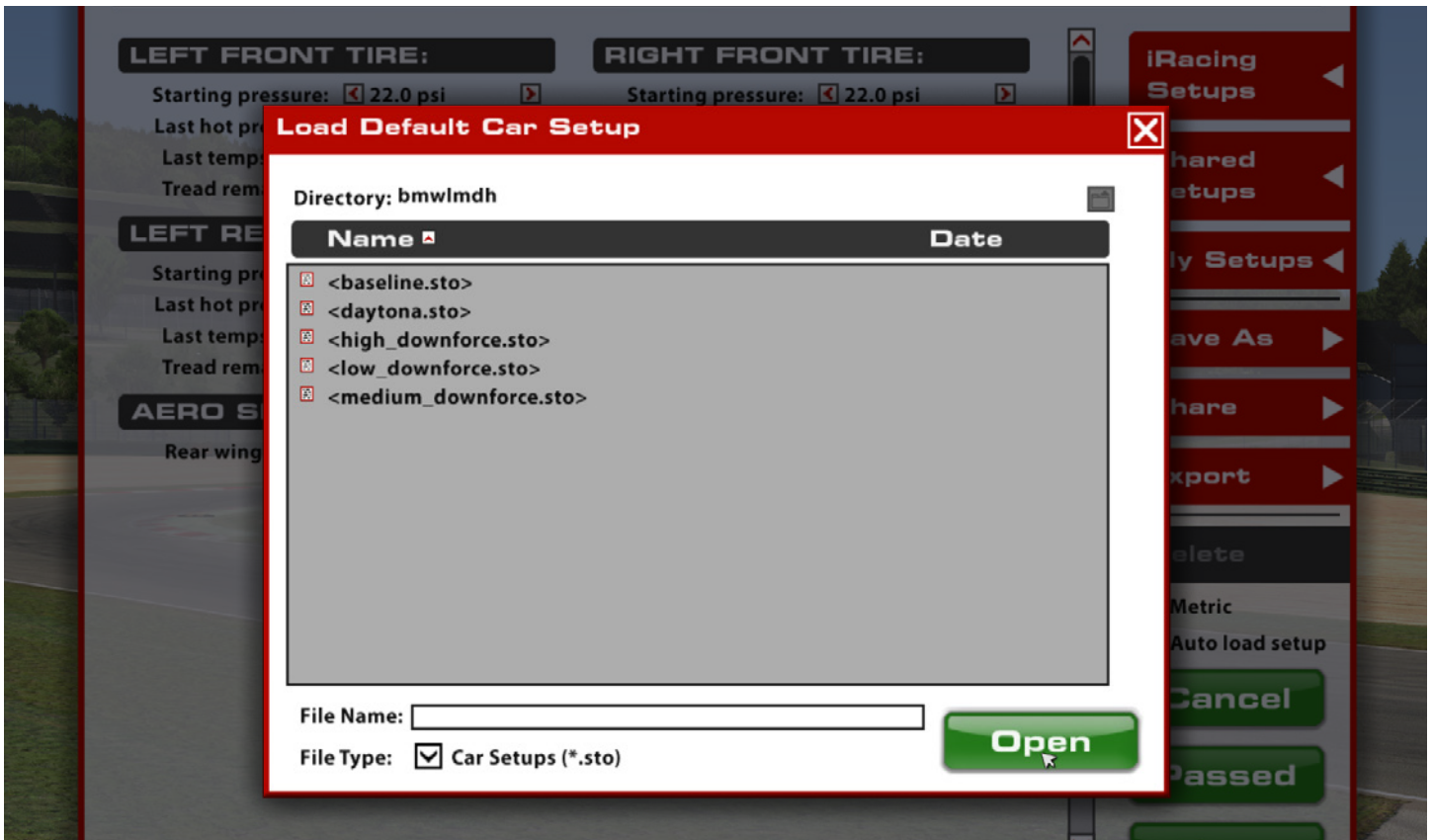


Before starting the car, it is recommended to map controls for Brake Bias, Traction Control and ABS adjustments. While this is not mandatory to drive the car, this will allow you to make quick changes to the driver aid systems to suit your driving style while out on the track.

Once you load into the car, getting started is as easy as selecting the “upshift” button to put it into gear, and hitting the accelerator pedal. This car uses a sequential transmission and does not require a clutch input to shift in either direction. However the car’s downshift protection will not allow you to downshift if it feels you are traveling too fast for the gear selected and would incur engine damage. If that is the case, the gear change command will simply be ignored.

Upshifting is recommended when the final shift light on the dashboard is illuminated in red. This is at 7100 rpm. Note; all shift lights will flash red at 7200 rpm as an additional warning however, this is beyond the optimal shift point.

## LOADING AN iRACING SETUP



Upon loading into a session, the car will automatically load the iRacing Baseline setup [baseline.sto]. If you would prefer one of iRacing's pre-built setups that suit various conditions, you may load it by clicking Garage > iRacing Setups > and then selecting the setup to suit your needs.

If you would like to customize the setup, simply make the changes in the garage that you would like to update and click apply. If you would like to save your setup for future use click "Save As" on the right to name and save the changes.

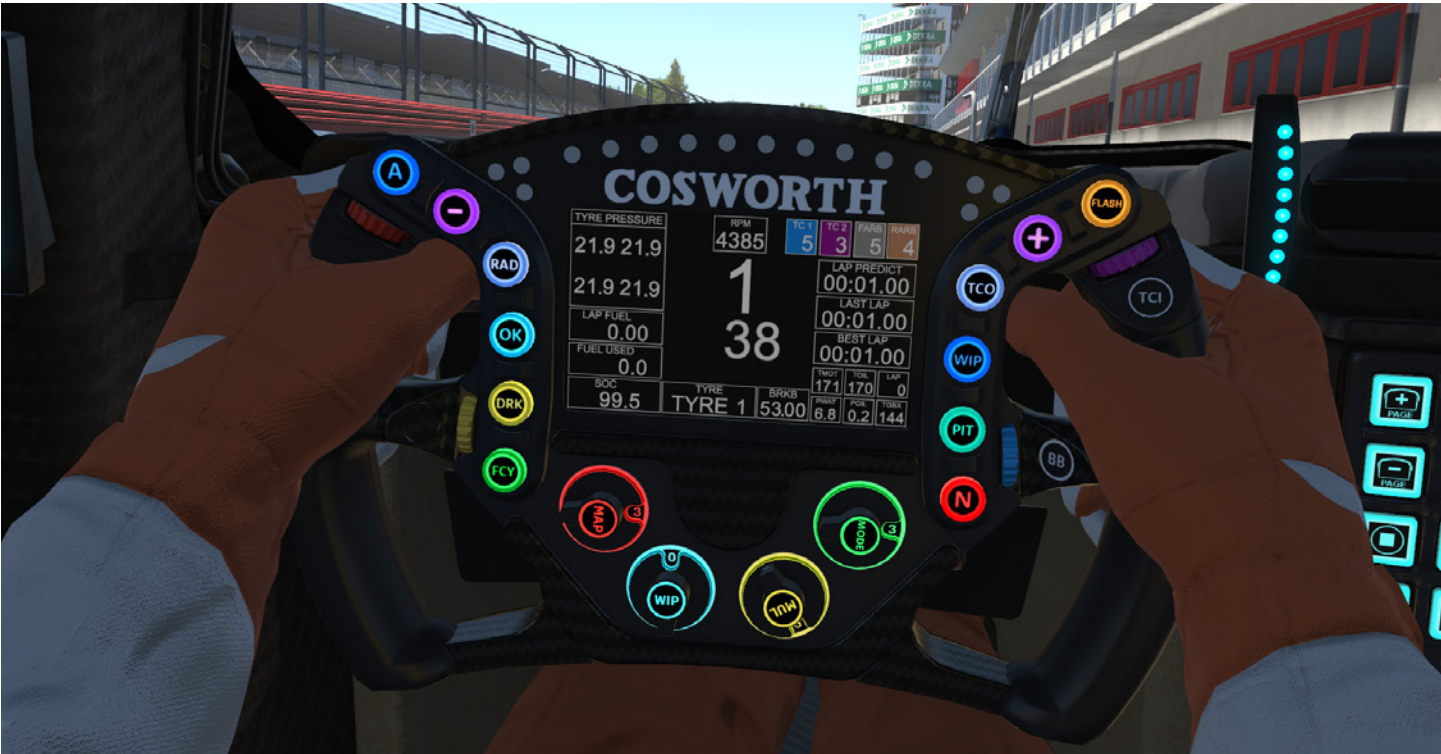
To access all of your personally saved setups, click "My Setups" on the right side of the garage.

If you would like to share a setup with another driver or everyone in a session, you can select "Share" on the right side of the garage to do so.

If a driver is trying to share a setup with you, you will find it under "Shared Setups" on the right side of the garage as well.



# Dash Configuration



The BMW M Hybrid V8 features a single-page, steering wheel mounted display to provide the driver with useful information in an easy-to-read format.

LEFT COLUMN

Type Pressure	Current air pressure in each tire, updated live and displayed in either PSI or Bar.
Lap Fuel	The amount of fuel used in the previous lap, in either gallons or liters, is updated at the end of each lap.
Fuel Used	The amount of fuel that has been used, in gallons or liters, since the fuel was last added to the car.
SOC	Current battery charge level, in percent.

CENTER COLUMN

RPM	The current engine RPM is shown at the top of the center section.
Gear Indicator	The currently-selected gear is shown as a large number in the center of the display.
BEAM	If the car's nighttime light system is on, this indicator will appear in the lower left of the center area.
Tyre	Inoperable
BRKB	Inoperable



## LOWER GROUP

TC1	Displays the current Traction Control Gain setting.
TC2	Displays the current Traction Control Slip setting.
FARB	Displays the current setting for the Front Anti-Roll Bar.
RARB	Displays the current setting for the Rear Anti-Roll Bar.
Lap Predict	The onboard systems will attempt to predict the current lap time based on splits.
Last Lap	The previously completed lap time, updated and displayed at the end of each lap.
Best Lap	The fastest lap of the current session.
TMOT	The engine's cooling fluid temperature, in either °F or °C.
TOIL	Engine oil temperature, in either °F or °C.
LAP	Displays the number of laps completed in the current session.
PWAT	Engine cooling fluid pressure, in PSI or Bar
POIL	Engine Oil system pressure, in PSI or Bar
TGBX	Gearbox oil temperature, in °F or °C.

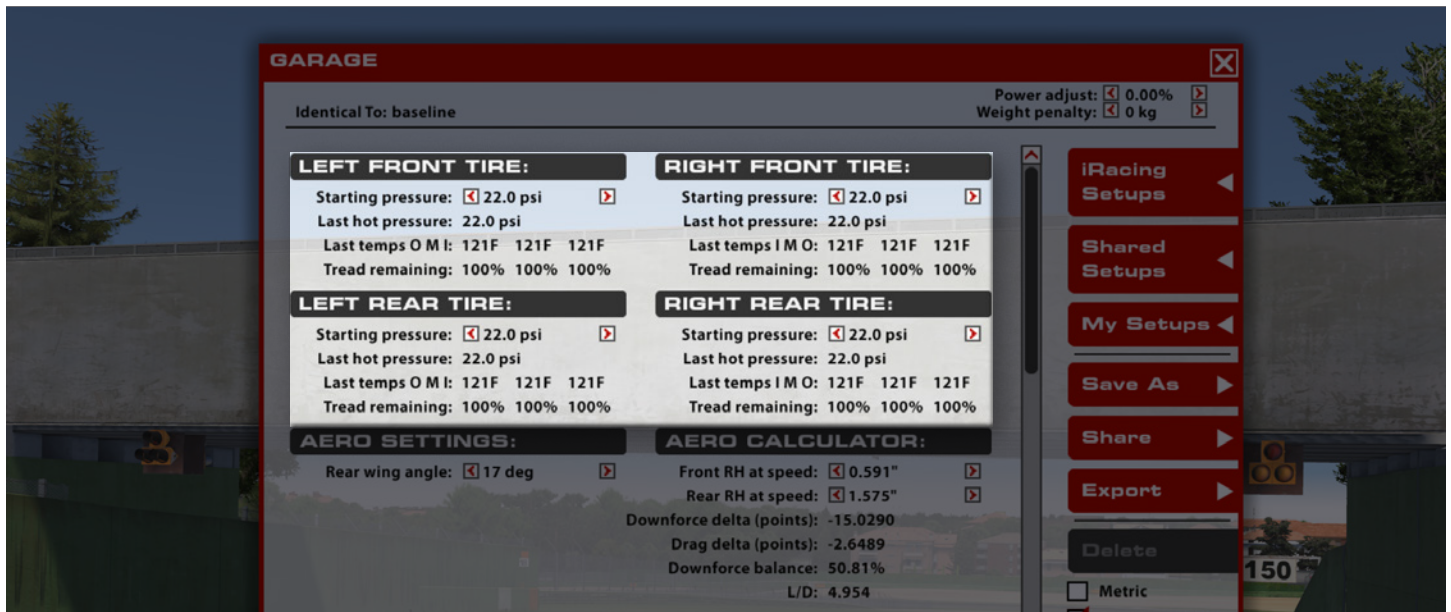
## Advanced Setup Options

This section is aimed toward more advanced users who want to dive deeper into the different aspects of the vehicle's setup. Making adjustments to the following parameters is not required and can lead to significant changes in the way a vehicle handles. It is recommended that any adjustments are made in an incremental fashion and only singular variables are adjusted before testing changes.



# Tires/Aero

## TIRE SETTINGS (ALL FOUR)



### STARTING PRESSURE

Air pressure in the tire when the car is loaded into the world. Higher pressures will reduce rolling drag and heat buildup, but will decrease grip. Lower pressures will increase rolling drag and heat buildup, but will increase grip. Higher speeds and loads will require higher pressures, while lower speeds and loads will see better performance from lower pressures. Cold pressures should be set to track characteristics for optimum performance.

### LAST HOT PRESSURE

Air pressure in the tire after the car has returned to the pits. The difference between Cold and Hot pressures can be used to identify how the car is progressing through a run in terms of balance, with heavier-loaded tires seeing a larger difference between Cold and Hot pressures. Ideally, tires that are worked in a similar way should build pressure at the same rate to prevent a change in handling balance over the life of the tire, so Cold pressures should be adjusted to ensure that similar tires are at similar pressures once up to operating temperature.

### LAST TEMPS OMI

Tire carcass temperatures once the car has returned from the pits. Wheel loads and the amount of work a tire is doing on-track is reflected in the tire's temperature, and these values can be used to analyze the car's handling balance. Center temperatures are useful for directly comparing the work done by each tire, while the Inner and Outer temperatures are useful for analyzing the wheel alignment while on track. These values are measured in three zones across the tread of the tire.

### TREAD REMAINING

The amount of tread remaining on the tire once the car has returned from the pits. Tire wear is very helpful in identifying any possible issues with alignment, such as one side of the tire wearing excessively, and can be used in conjunction with tire temperatures to analyze the car's handling balance. These values are measured in three zones across the tread of the tire.

## AERO SETTINGS



### REAR WING ANGLE

The rear wing angle setting changes the Angle of Attack of the wing elements. Increasing wing angle increases the downforce generated by the wing but increases drag, while decreasing the wing angle reduces the downforce generated by the wing while reducing drag. Rear wing angle has a heavy influence on rear downforce, having a heavy influence on rear-end grip in mid- to high-speed corners.

## AERO CALCULATOR



The Aero Calculator is a tool used to display the car's approximate aerodynamic values in a given configuration. Changes to the car's aerodynamic settings (Wing Angles, Dive Planes, Gurney Flaps) will be reflected in the Aero Calculator; giving an idea of how the car will behave aerodynamically while on the race track. This calculator can also be used to determine what changes need to be made to the car to alleviate aerodynamically-induced handling issues.

### FRONT/REAR RH AT SPEED

The Ride Height (RH) at Speed is used to give the Aero Calculator heights to reference for aerodynamic calculations. When using the Aero Calculator, determine the car's Front and Rear Ride height via telemetry at any point on track and input that value into the "Front RH at Speed" setting.

### DOWNFORCE DELTA

The Downforce Delta is a numerical representation of how much the baseline aero map has been altered with the car's current configuration in terms of downforce. Downforce is represented as a negative lift, so higher Delta values indicate a decrease in downforce while lower values indicate an increase in downforce.



## DRAG DELTA

The Drag Delta is a numerical representation of how much the baseline aero map has been altered with the car's current configuration in terms of drag. The value shows how much the total drag has been offset from the baseline values with higher values indicating an increase in drag while lower values indicate a decrease in drag.

## DOWNFORCE BALANCE

Displayed in percent of Front downforce, this value shows how much of the car's total downforce is over the front axle. A higher percentage value indicates more front downforce, increasing oversteer in mid- to high-speed corners and a lower percentage value indicates more rear downforce, increasing understeer in mid- to high-speed corners.

## L/D

The "L/D" value is the ratio of Lift (downforce) to Drag. This quantifies how efficiently the car's bodywork is producing downforce in terms of how much drag is being produced as a result. A higher L/D value means more downforce is being produced for each unit of drag, meaning the bodywork is being more efficient. Having a higher L/D value without sacrificing overall downforce will result in a faster, more efficient car. Optimum values for L/D can vary based on the aerodynamic configuration and track type.

# Chassis

## FRONT



### HEAVE SPRING

The front Heave Spring is a suspension element that handles external loads from purely vertical loads and doesn't control loads that would induce chassis roll when cornering. Generally these loads are present for increasing downforce loads at higher speeds, dips and crests in the track, or under heavy braking. Higher rate values will stiffen the suspension in heave, which is good for controlling ride heights to maintain a good aerodynamic platform, but can produce a bouncing effect on rough surfaces. Lower rates will absorb bumps and loads easier, but will hurt the aerodynamic platform due to excessive chassis movement.

### HEAVE PERCH OFFSET

The Heave Perch Offset is used to adjust preload on the Heave Spring. This is one of two methods to adjust ride height through the front Heave element, with lower values preloading the spring more and raising front ride heights. Conversely, higher values will unload the spring and lower front ride heights.

### HEAVE SPRING DEFL

Heave Spring Deflection represents the amount the Heave Spring is compressed under static conditions. This is not directly adjustable but will change with adjustments to the Heave Perch Offset and front Torsion Bar settings.

### HEAVE SLIDER DEFL

The Slider Deflection is how far the slider mechanism the Heave Spring is mounted on has compressed from fully extended. Similar to a shock but without any damping forces produced, this doesn't influence the suspension's behavior.

### ARB SIZE

The ARB (Anti-Roll Bar) size alters the stiffness of the front suspension in roll. Increasing the ARB size will increase the roll stiffness of the front suspension, resulting in less body roll but increasing mechanical understeer. This can also, in some cases, lead to a more responsive steering feel from the driver. Conversely, reducing the ARB size will soften the suspension in roll, increasing body roll but decreasing mechanical understeer. This can result in a less-responsive feel from the steering, but grip across the front axle will increase.



## ARB BLADES

The configuration of the Anti-Roll Bar arms, or “blades”, can be changed to alter the overall stiffness of the ARB assembly. Higher values transfer more force through the arms to the ARB itself, increasing roll stiffness in the front suspension and producing the same effects, albeit on a smaller scale, as increasing the diameter of the sway bar. Conversely, lower values reduce the roll stiffness of the front suspension and produce the same effects as decreasing the diameter of the sway bar. These blade adjustments can be thought of as fine-tuning adjustments between sway bar diameter settings

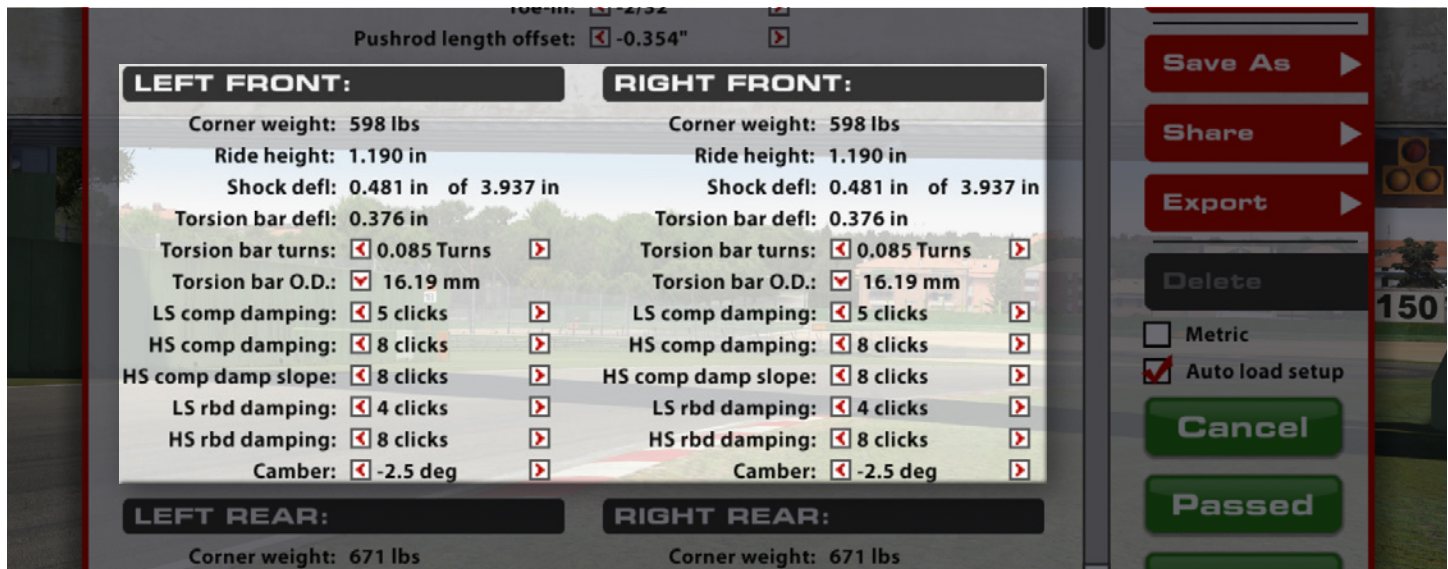
## TOE-IN

Toe is the angle of the wheel, when viewed from above, relative to the centerline of the chassis. Toe-in is when the front of the wheel is closer to the centerline than the rear of the wheel, and Toe-out is the opposite. On the front end, adding toe-out will increase slip in the inside tire while adding toe-in will reduce the amount of slip. This can be used to increase straight-line stability and turn-in responsiveness with toe-out. Toe-in at the front will reduce turn-in responsiveness but will reduce temperature buildup in the front tires.

## PUSHROD LENGTH OFFSET

This adjusts the length of both front suspension pushrods together, shown as an offset from a baseline length figure. This is a great way to adjust front ride height without altering the preload on the Heave Spring or either front Torsion Bars.

## FRONT CORNERS



### CORNER WEIGHT

The weight underneath each tire under static conditions in the garage. Correct weight arrangement around the car is crucial for optimizing a car for a given track and conditions. Individual wheel weight adjustments and crossweight adjustments are made via the Torsion Bar Turns setting on the front corners and the Spring Perch Offset on the rear corners.

### RIDE HEIGHT

Distance from ground to a reference point on the chassis. Since these values are measured to a specific reference point on the car, these values may not necessarily reflect the vehicle's ground clearance, but instead provide a reliable value for the height of the car off of the race track at static values. Adjusting Ride Heights is key for optimum performance, as they can directly influence the vehicle's aerodynamic performance as well as mechanical grip. Increasing the front ride height will decrease overall downforce and shift the aerodynamic balance rearward, but will decrease drag slightly. Conversely, reducing front ride height will increase downforce and shift aero balance forward while slightly increasing overall drag.

### SHOCK DEFLECTION

Shock Deflection is how much the shock has compressed from its fully extended length while under static conditions in the garage. This is useful for determining how much shock travel is available before a bump stop is engaged on the shock.

### TORSION BAR DEFLECTION

The Torsion Bar Deflection is a representation of how much the front torsion bar springs have been preloaded under static conditions. Higher deflection values show higher amounts of spring preload, lower values represent less spring preload.

### TORSION BAR TURNS

Used to adjust ride height and corner weight, adjusting this setting applies a preload to the torsion bar under static conditions. Decreasing the value increases preload on the torsion bar, adding weight to its corner and increasing the ride height at that corner. Increasing the value does the opposite, reducing height and weight on a given corner. These should be adjusted in pairs (left and right, for example) or with all four spring preload adjustments in the car to prevent crossweight changes while adjusting ride height.



## TORSION BAR O.D.

Similar to an Anti-Roll Bar, a torsion bar is a spring that exerts resistive forces via applied torque generated through suspension travel. However, these torsion bars are fixed to the chassis at one end, and thus resist movement only on one wheel in the same way a coil spring resists movement and load changes. Increasing the torsion bar's diameter gives a higher spring rate, and reducing the diameter gives a lower spring rate. Stiffer springs are very helpful for smooth tracks and applications where a high level of aerodynamic attitude control is required, however stiff springs reduce mechanical grip significantly, especially over bumps. On low-grip and/or bumpy tracks, as well as lower speed tracks where aerodynamics may not be as effective, softer springs will increase mechanical grip while sacrificing aerodynamic control. Torsion Bar Diameter adjustments should be made in conjunction with ride height adjustments to prevent unwanted grounding of the chassis while on track.

## LS COMP DAMPING

Low Speed Compression affects how resistant the shock is to compression (reduction in length) when the shock is moving at relatively low speeds, usually in chassis movements as a result of driver input (steering, braking, & throttle) and cornering forces. Higher values will increase compression resistance and transfer load onto a given tire under these low-speed conditions more quickly, inducing understeer. Lower values will slow weight transfer to a tire, reducing understeer when applied to the front shocks.

## HS COMP DAMPING

High Speed Compression affects the shock's behavior in high-speed travel, usually attributed to curb strikes and bumps in the track's surface. Higher compression values will cause the suspension to be stiffer in these situations, while lower values will allow the suspension to absorb these bumps better but may hurt the aerodynamic platform around the track.

## LS REBOUND DAMPING

Low-speed Rebound damping controls the stiffness of the shock while extending at lower speeds, typically during body movement as a result of driver inputs. Higher rebound values will resist expansion of the shock, lower values will allow the shock to extend faster. Higher rebound values can better control aerodynamic attitude but can result in the wheel being unloaded when the suspension can't expand enough to maintain proper contact with the track. When tuning for handling, higher front low-speed rebound can increase on-throttle mechanical understeer (but reduce splitter lift) while lower values will maintain front end grip longer, helping to reduce understeer, but will allow more splitter lift. Excessive front rebound can lead to unwanted oscillations due to the wheel bouncing off of the track surface instead of staying in contact.

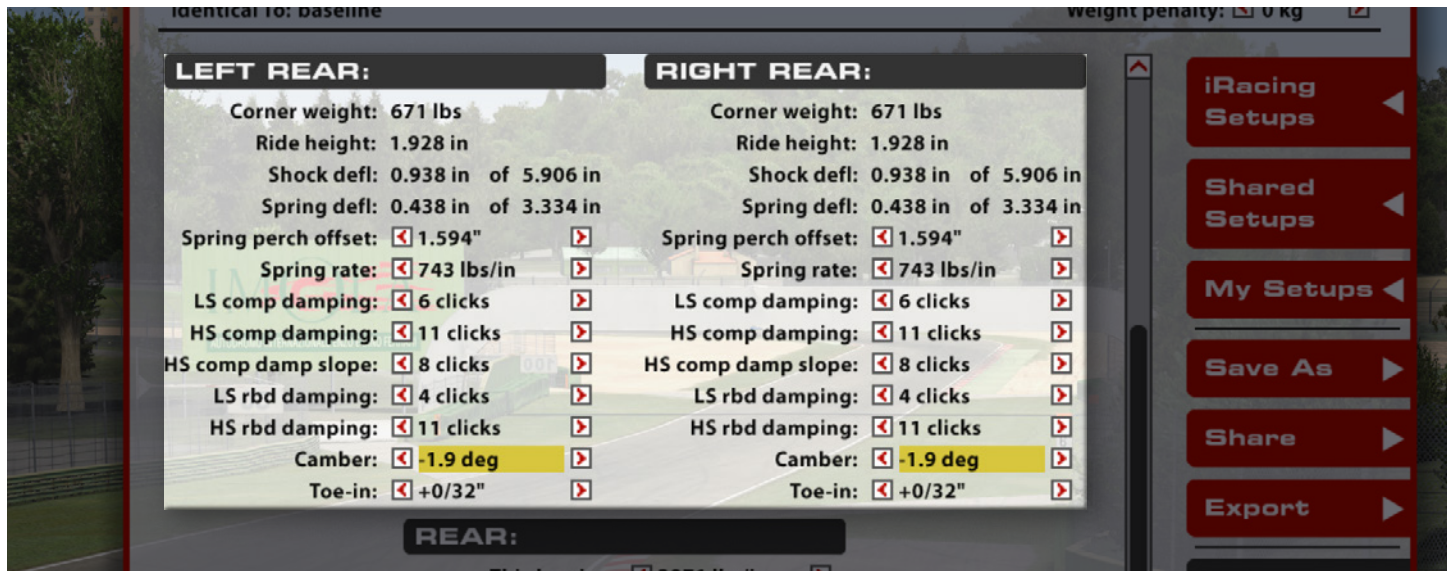
## HS REBOUND DAMPING

High-speed rebound adjusts the shock in extension over bumps and curb strikes. Higher values will reduce how quickly the shock will expand, while lower values will allow the shock to extend more easily. Despite not having as much of an effect on handling in result to driver inputs, High-speed rebound can produce similar results in terms of aerodynamic control and uncontrolled oscillations if set improperly.

## CAMBER

Camber is the vertical angle of the wheel relative to the center of the chassis. Negative camber is when the top of the wheel is closer to the chassis centerline than the bottom of the wheel, positive camber is when the top of the tire is farther out than the bottom. Due to suspension geometry and corner loads, negative camber is desired on all four wheels. Higher negative camber values will increase the cornering force generated by the tire, but will reduce the amount of longitudinal grip the tire will have under braking. Excessive camber values can produce very high cornering forces but will also significantly reduce tire life, so it is important to find a balance between life and performance.

## REAR CORNERS



### CORNER WEIGHT

The weight underneath each tire under static conditions in the garage. Correct weight arrangement around the car is crucial for optimizing a car for a given track and conditions. Individual wheel weight adjustments and crossweight adjustments are made via the Spring Perch Offset setting.

### RIDE HEIGHT

Distance from ground to a reference point on the chassis. Since these values are measured to a specific reference point on the car, these values may not necessarily reflect the vehicle's ground clearance, but instead provide a reliable value for the height of the car off of the race track at static values. Adjusting Ride Heights is key for optimum performance, as they can directly influence the vehicle's aerodynamic performance as well as mechanical grip. Raising the rear ride height will increase overall downforce and shift aero to the front of the car but will increase drag. Decreasing rear ride height will do the opposite, with aero shifting rearward and overall downforce and drag decreasing.

### SHOCK DEFLECTION

Shock Deflection is how much the shock has compressed from its fully extended length while under static conditions in the garage. This is useful for determining how much shock travel is available before a bump stop is engaged on the shock.

### SPRING DEFLECTION

Spring Deflection shows how much the spring has compressed from its unloaded length. This can be used to see spring preload under static conditions and compare it against other corners of the car, with higher values representing more preload on a given spring.

### SPRING PERCH OFFSET

Used to adjust ride height and corner weight, adjusting this setting applies a preload to the spring under static conditions. Decreasing the value increases preload on the spring, adding weight to its corner and increasing the ride height at that corner. Increasing the value does the opposite, reducing height and weight on a given corner. These should be adjusted in pairs (left and right, for example) or with all four spring preload adjustments in the car to prevent crossweight changes while adjusting ride height.

## SPRING RATE

Spring Rate changes how stiff the spring is, represented in a force per unit of displacement. Primarily responsible for maintaining ride height and aerodynamic attitude under changing wheel loads, stiffer springs will maintain the car's aero platform better while sacrificing mechanical grip. Softer springs will deal with bumps better and increase mechanical grip, but will cause the car's aerodynamic platform to suffer. Due to homologation rules, rear spring rates must be symmetrical across the rear axle and can only be changed in pairs.

## LS COMP DAMPING

Low Speed Compression affects how resistant the shock is to compression (reduction in length) when the shock is moving at relatively low speeds, usually in chassis movements as a result of driver input (steering, braking, & throttle) and cornering forces. Higher values will increase compression resistance and transfer load onto a given tire under these low-speed conditions more quickly, inducing understeer on throttle application.

## HS COMP DAMPING SLOPE

The Compression Damping Slope setting controls the overall shape of the high-speed compression side of the shock. Lower slope values produce a flatter, more digressive curve while higher values result in a more linear and aggressive compression graph. The value of the slope setting is very important in controlling bump absorption at high shock velocities and controlling the aerodynamic platform. A lower slope will be helpful for rougher tracks in absorbing bumps and sharp impacts such as curbs, while a higher slope will keep the suspension more rigid. It's important to understand that these settings will affect the range the High-Speed Compression will have, with higher slope values producing a higher overall force for high-speed compression.

## LS REBOUND DAMPING

Low-speed Rebound damping controls the stiffness of the shock while extending at lower speeds, typically during body movement as a result of driver inputs. Higher rebound values will resist expansion of the shock, lower values will allow the shock to extend faster. Higher rebound values can better control aerodynamic attitude but can result in the wheel being unloaded when the suspension can't expand enough to maintain proper contact with the track. When tuning for handling, higher rear low-speed rebound can increase off-throttle mechanical understeer (but reduce rear-end lift) while lower values will maintain rear end grip longer, helping to reduce oversteer, but will allow more rear end lift under deceleration. Excessive rear rebound can lead to unwanted oscillations due to the wheel bouncing off of the track surface instead of staying in contact.

## HS REBOUND DAMPING

High-speed rebound adjusts the shock in extension over bumps and curb strikes. Higher values will reduce how quickly the shock will expand, while lower values will allow the shock to extend more easily. Despite not having as much of an effect on handling in result to driver inputs, High-speed rebound can produce similar results in terms of aerodynamic control and uncontrolled oscillations if set improperly.

## CAMBER

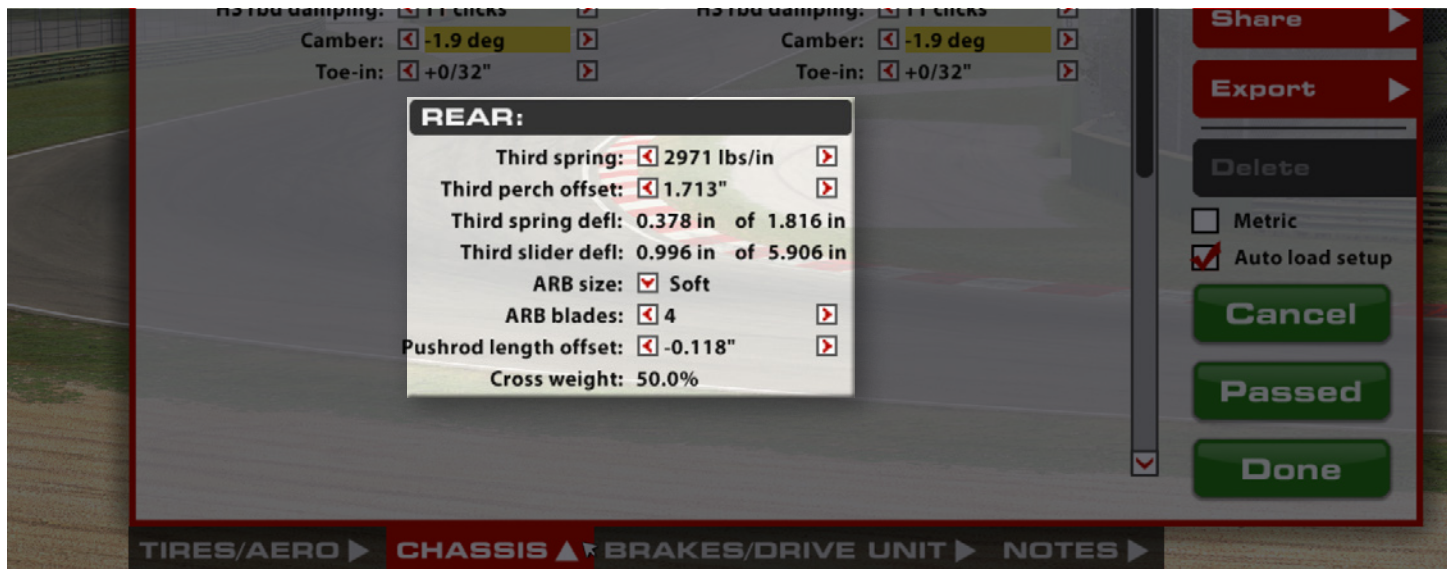
Camber is the vertical angle of the wheel relative to the center of the chassis. Negative camber is when the top of the wheel is closer to the chassis centerline than the bottom of the wheel, positive camber is when the top of the tire is farther out than the bottom. Due to suspension geometry and corner loads, negative camber is desired on all four wheels. Higher negative camber values will increase the cornering force generated by the tire, but will reduce the amount of grip the tire will have under braking. Excessive camber values can produce very high cornering forces but will also significantly reduce tire life, so it is important to find a balance between life and performance. Higher rear camber values can increase cornering stability but reduce stability under braking.



## TOE-IN

Toe is the angle of the wheel, when viewed from above, relative to the centerline of the chassis. Toe-in is when the front of the wheel is closer to the centerline than the rear of the wheel, and Toe-out is the opposite. On the rear end, adding toe-in will increase straight-line stability but may hurt how well the car changes direction.

## REAR



### THIRD SPRING

The Third Spring, similar to the front Heave Spring, is a spring element configured to provide resistance only in vertical suspension movement without affecting roll stiffness. This spring element is helpful with controlling increasing aerodynamic loads and maintaining the proper aerodynamic attitude around a circuit. The rear end's third spring is crucial in maintaining and controlling the rear ride height around a circuit to maximize the downforce produced by the rear bodywork.

### THIRD PERCH OFFSET

The Third Perch Offset is used to adjust preload on the rear Third Spring. This is one of two methods to adjust ride height through the rear Third Spring element, with lower values preloading the spring more and raising front ride heights. Conversely, higher values will unload the spring and lower front ride heights.

### THIRD SPRING DEFLECTION

Third Spring Deflection represents the amount the rear Third Spring is compressed under static conditions. This is not directly adjustable but will change with adjustments to the Third Perch Offset and rear Spring settings.

### THIRD SLIDER DEFLECTION

The Slider Deflection is how far the slider mechanism the Third Spring is mounted on has compressed from fully extended. Similar to a shock but without any damping forces produced, this doesn't influence the suspension's behavior.

### ARB SIZE

The ARB (Anti-Roll Bar) size alters the stiffness of the rear suspension in roll. Increasing the ARB size will increase the roll stiffness of the rear suspension, resulting in less body roll but increasing mechanical oversteer. Conversely, reducing the ARB size will soften the suspension in roll, increasing body roll but decreasing mechanical oversteer. This can result in a less-responsive feel from the steering, but grip across the rear axle will increase.

## ARB BLADES

The configuration of the Anti-Roll Bar arms, or “blades”, can be changed to alter the overall stiffness of the ARB assembly. Higher values transfer more force through the arms to the ARB itself, increasing roll stiffness in the rear suspension and producing the same effects, albeit on a smaller scale, as increasing the diameter of the Anti-roll bar. Conversely, lower values reduce the roll stiffness of the rear suspension and produce the same effects as decreasing the diameter of the Anti-roll bar. These blade adjustments can be thought of as fine-tuning adjustments between Anti-roll bar diameter settings.

## PUSHROD LENGTH OFFSET

This adjusts the length of both front suspension pushrods together, shown as an offset from a baseline length figure. This is a great way to adjust front ride height without altering the preload on the Heave Spring or either front Torsion Bars.

## CROSSWEIGHT

Cross weight is the amount of weight on the car’s Left-Rear and Right-Front tires relative to the entire weight of the car, displayed in percent. This is adjusted via the corner spring preload adjustments (Front Torsion Bar Turns and Rear Spring Perch Offset). This value should be around 50% for most tracks.



# Brakes/Drive Unit

## BRAKE SPEC



### PAD COMPOUND

The vehicle's braking performance can be altered via the Brake Pad Compound. The "Low" setting provides the least friction, reducing the effectiveness of the brakes but allowing for better brake pressure modulation, while "Medium" and "High" provide more friction and increase the effectiveness of the brakes while increasing the risk of a brake lockup.

### FRONT MASTER CYLINDER

The Front Brake Master Cylinder size can be changed to alter the line pressure to the front brake calipers. A larger master cylinder will reduce the line pressure to the front brakes, which will shift the brake bias rearwards and increase the pedal effort required to lock the front wheels. A smaller master cylinder will increase brake line pressure to the front brakes, shifting brake bias forward and reducing required pedal effort to lock the front wheels.

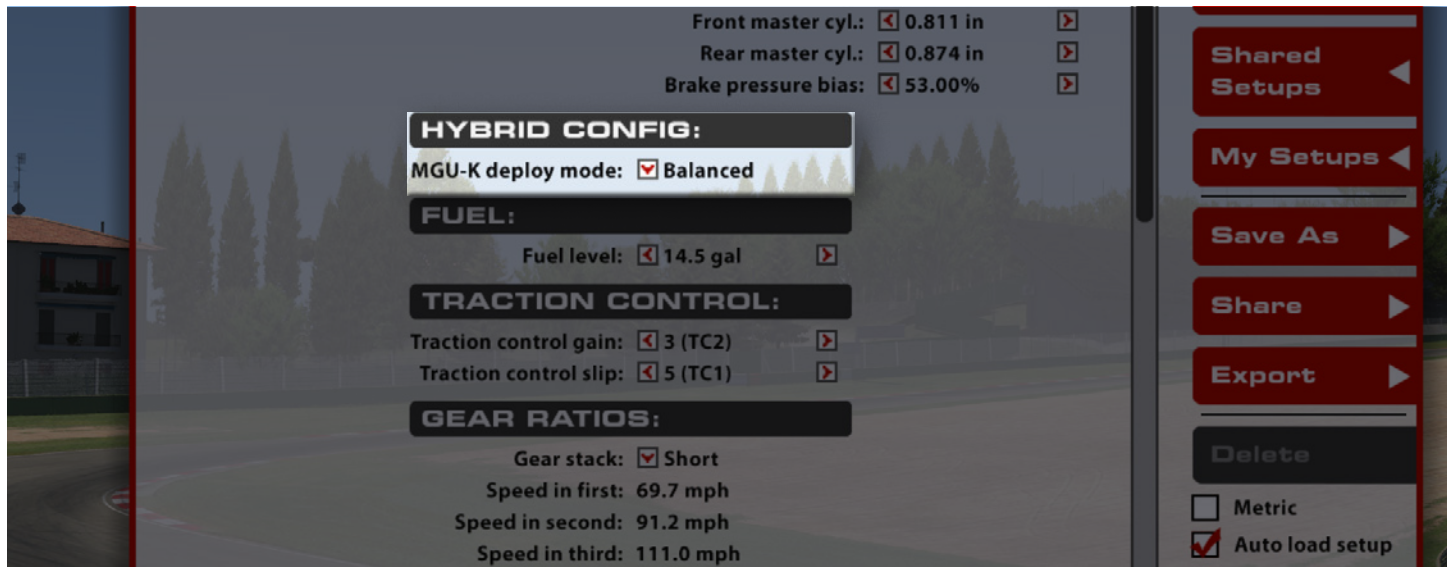
### REAR MASTER CYLINDER

The Rear Brake Master Cylinder size can be changed to alter the line pressure to the rear brake calipers. A larger master cylinder will reduce the line pressure to the rear brakes, which will shift the brake bias forwards and increase the pedal effort required to lock the rear wheels. A smaller master cylinder will increase brake line pressure to the rear brakes, shifting brake bias rearward and reducing required pedal effort to lock the rear wheels.

### BRAKE PRESSURE BIAS

Brake Bias is the percentage of braking force that is being sent to the front brakes. Values above 50% result in more pressure being sent to the front, while values less than 50% send more force to the rear. This should be tuned for both driver preference and track conditions to get the optimum braking performance for a given situation.

## HYBRID CONFIG

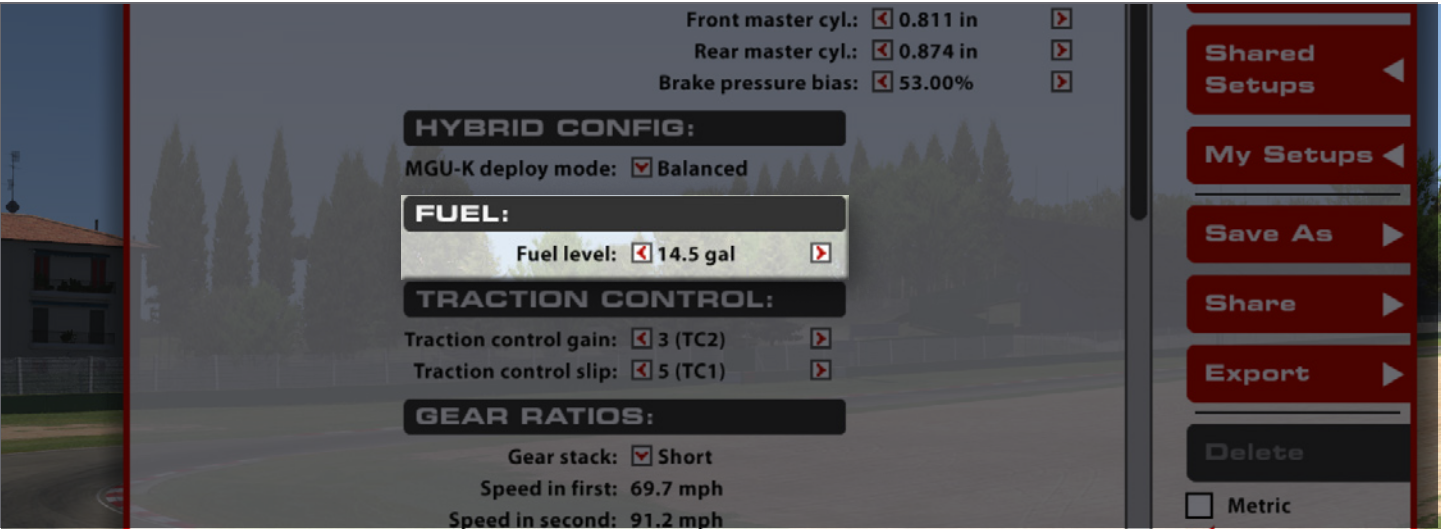


### MGU-K DEPLOY MODE

The Hybrid power system on the BMW V8 can be set to one of five modes to change the target battery State of Charge (SoC) after each lap. Each of these modes will use varying levels of energy throughout a lap to reach a target, and thus some will produce more power over the course of a lap and faster lap times at the cost of discharging the battery.

- **No Deploy** - In the "No Deploy" mode, the Hybrid system will not use any energy stored in the battery. This essentially disables the Hybrid drive system and will only charge the battery throughout a lap. This is only available in Qualifying and Test sessions and is used to fully charge the battery before switching to Qual mode.
- **Qual** - This mode is intended to be used on flying laps during qualifying sessions and will attempt to use all of the battery charge during a lap. This is only available during Qualifying and Test sessions and should be preceded by the No Deploy setting on outlaps and warm-up laps to ensure the battery is fully charged before switching to the Qual mode.
- **Attack** - Attack mode reduces the target State of Charge to use more power during race sessions to help with overtaking. Generally the laptime gain from this mode is not enough to offset the loss in pace from having to recharge and recover from using Attack mode, so it should be used only when it is absolutely necessary to complete an overtake. This mode can also be used on the final lap for a burst of speed since the battery is no longer needed. This mode is only available for Practice, Race, and Test sessions
- **Balanced** - The Balanced mode is the primary Race mode for the Hybrid system. This mode will attempt to deploy electrical charge to reduce lap times as much as possible while still maintaining a reasonable State of Charge over the duration of a lap. At the start of a session, it will take a few flying laps for the Hybrid system to learn the track and optimize deployment for the best lap times, and this mode is only available in Practice, Race, and Test sessions
- **Build** - The Build mode will attempt to build battery charge as quickly as possible in the event of a low battery charge or if it is needed prior to switching to Attack mode. Note that this will compromise lap times significantly compared to Balanced, and it's important to switch back to Balanced mode once the battery has charged to avoid losing harvested energy and to prevent unnecessary loss in pace. This mode is only available in Practice, Race, and Test sessions.

FUEL



FUEL

Fuel level is the amount of fuel in the fuel tank when the car leaves the garage.

TRACTION CONTROL



TRACTION CONTROL GAIN

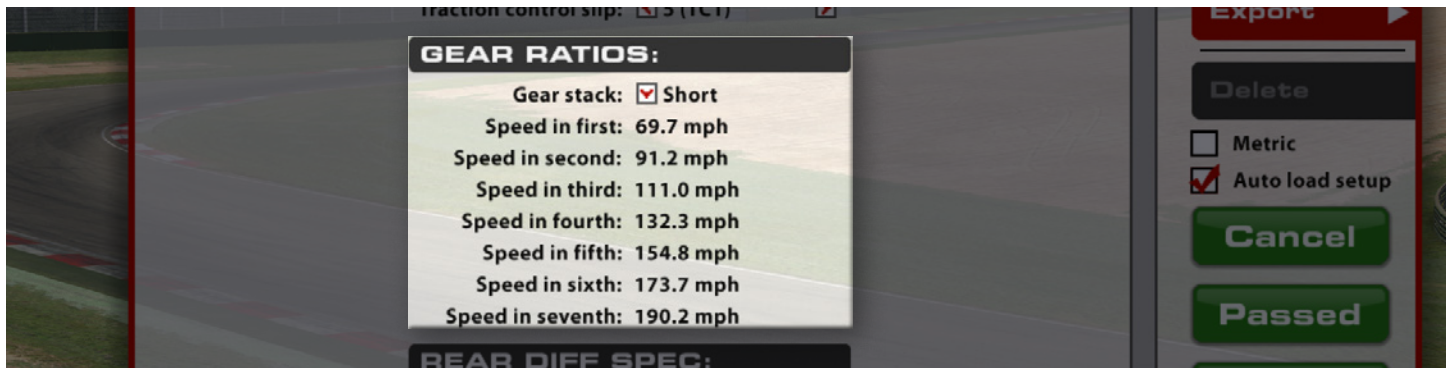
Gain is the amount of intervention the Traction Control will exert when wheel spin is detected. Higher values result in a more aggressive throttle cut to control wheel-spin.

TRACTION CONTROL SLIP

Slip is how sensitive the Traction Control system will be to wheel-spin. Higher values will activate the Traction Control system with smaller amounts of wheel-spin, while lower values will allow slightly more wheel-spin prior to activating the system.



## GEAR RATIOS



### GEAR STACK

Gear Stack changes the gear ratios in the transmission. Two choices are available: Short and Long. The Short setting will choose a more acceleration-focused gear set for tracks with shorter straights or slower corners, while the Long option will choose gears more suited to high-speed tracks with long straights.

### GEAR SPEEDS

Each of the transmission's seven forward gears will show the approximate ground speed at which the engine will reach maximum RPM. These values will change based on which Gear Stack is selected, but the true maximum speed may differ slightly due to on-track conditions.

## REAR DIFF SPEC



### COAST/DRIVE RAMP ANGLES

Coast and Drive Ramp Angles affect the force exerted by the differential to keep both driven tires locked together under acceleration. Lower values produce more locking force, and more locking force increases understeer during braking and acceleration phases. Higher values will produce less locking force and induce oversteer in these situations.

### CLUTCH FRICTION PLATES

The number of clutch faces affect how much overall force is applied to keep the differential locked. Treated as a multiplier, adding more faces produces increasingly more locking force.

### PRELOAD

The differential can be set with a static load applied. Higher values produce more locking force in the differential in all conditions, producing more understeer under acceleration and deceleration. This value will also affect mid-corner performance, with higher values not allowing the differential to unlock as much, increasing mid-corner understeer.