dallara

USER MANUAL
DALLARA IR18

dallara

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DEAR iRACING USER,

Congratulations on your purchase of the Dallara IR18! From all of us at iRacing, we appreciate your support and your commitment to our product. We aim to deliver the ultimate sim racing experience, and we hope that you'll find plenty of excitement with us behind the wheel of your new car!

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!

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CHASSIS

DOUBLE A-ARM PUSHROD WITH THIRD SPRING (FRONT AND REAR)

LENGTH	WIDTH	WHEELBASE	DRY WEIGHT	WET WEIGHT WITH DRIVER
5000 mm 196.9 in	2011 mm 79 in	3023-3073 mm 119-121 in	845 kg 1862 lbs	900 kg 1984 lbs

POWER UNIT

TURBOCHARGED V6 WITH PUSH-TO-PASS

DISPLACEMENT	RPM LIMIT	TORQUE	POWER
2.2 Liters 134.3 CID	12000	300 lb-ft 410 Nm	700 bhp 522 kW

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.

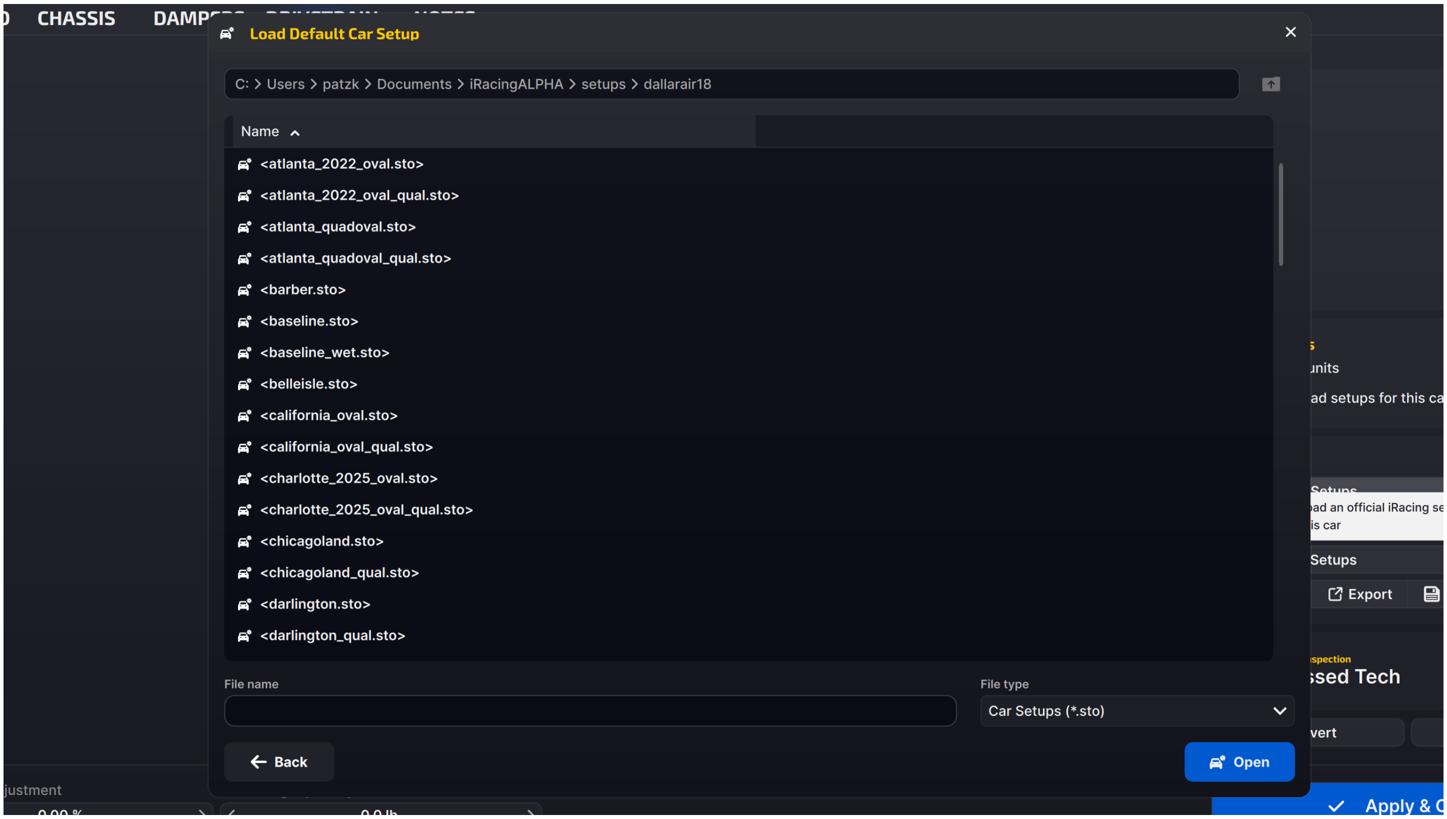
After you have selected an appropriate setup, get on track and focus on making smooth and consistent laps, identifying the proper racing line and experiencing tire wear and handling trends over a number of laps.

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

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.

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.

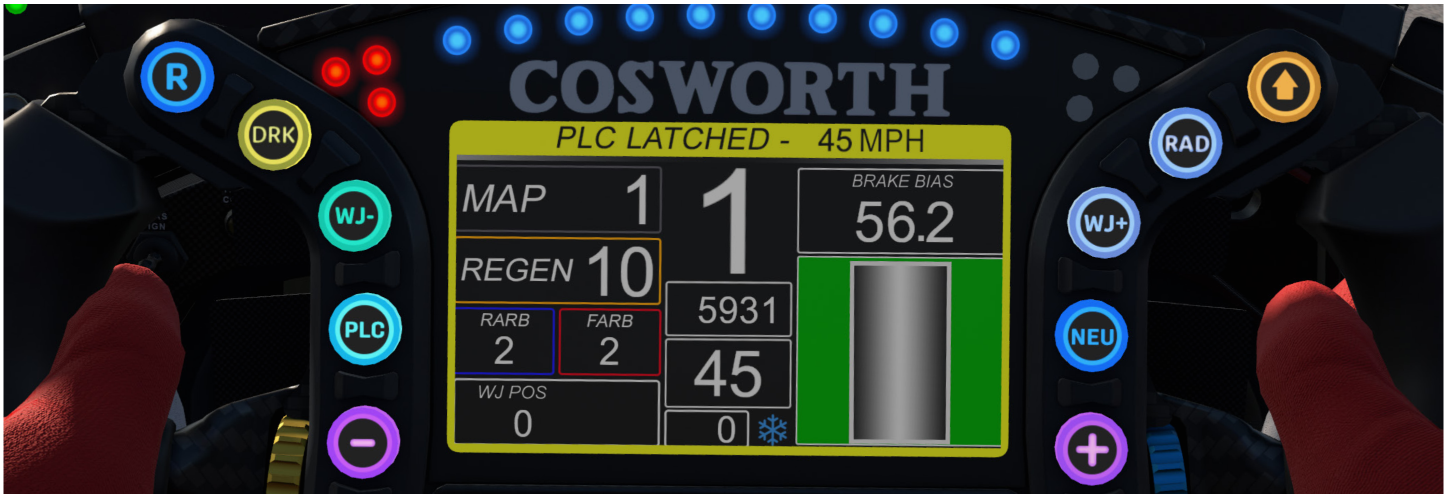
DASH CONFIGURATION

Left Cluster	
MAP	Current engine map setting
REGEN	Current Regen level
RARB	Rear ARB setting
FARB	Front ARB setting
WJ POS	Weight Jacker setting
BIAS	Current Brake Bias setting

Middle	
Gear Indicator	The large number in the center of the display is the currently selected gear
Laptime	Previously completed lap time
Delta	Difference between the current lap and the session best lap
Lap Counter	Number of laps completed in the session

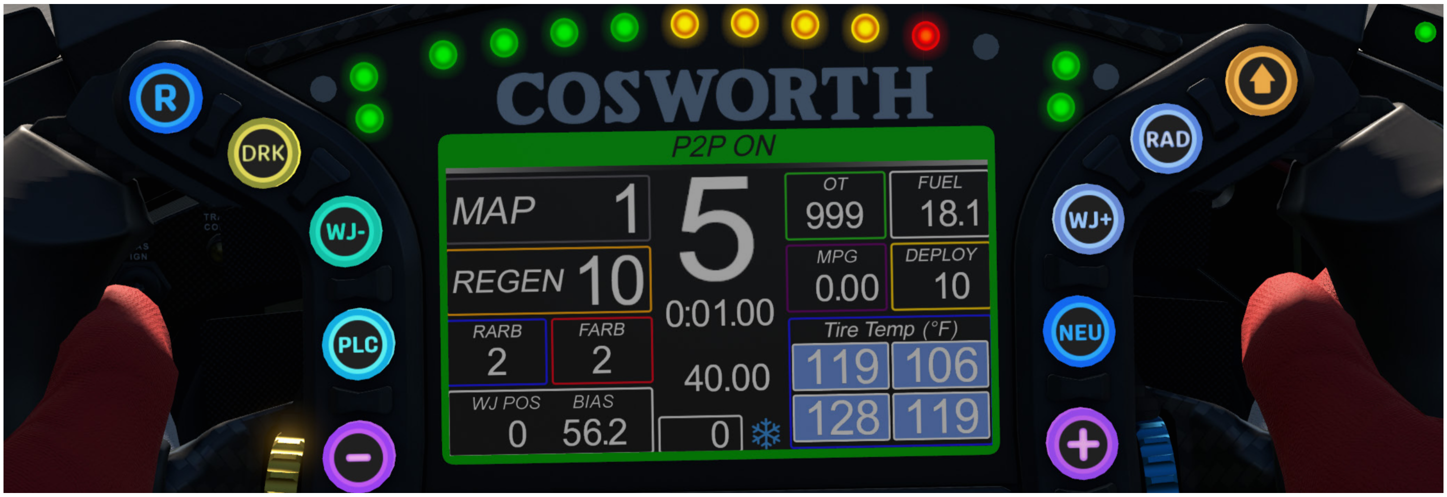
Right Cluster	
OT	Push To Pass time remaining in seconds
Fuel	Fuel remaining in Gallons
MPG/LPL	Current fuel economy calculation in Miles Per Gallon or Liters Per Lap
DEPLOY	Current Deploy level
Tire Temp	Live tire temperatures in °F or °C

PIT LIMITER



When the Pit Limiter is active all of the shift lights will flash in blue and the display will have a yellow border. A color-coded box in the lower right will appear under a brake bias display, with Green indicating a speed below pit limit, yellow being at the pit limit, and red indicates speeding.

PUSH-TO-PASS



When Push-to-Pass is active, the inner pairs of status LEDs will illuminate in green and the display will have a green border.

SHIFT LIGHTS

SHIFT LIGHTS

The uppermost row of LED lights above the display are shift lights linked to engine RPM. As RPM approaches the maximum, the lights will begin to illuminate left-to-right starting with green, then yellow, then red. Once all ten lights have illuminated and RPM climbs further, the lights will turn blue and begin flashing to signal an upshift is necessary.

CAUTION LIGHTS

If a Caution period begins, the right-side cluster of three LEDs on either side of the main display will illuminate in yellow.

HYBRID STATUS LIGHT

A three-LED cluster on the left side of the display indicates whether the hybrid system is in Deploy or Regeneration mode. During Regeneration (either deceleration or manually-activated regen) the lights will illuminate in Red. During Deploy, the lights will illuminate in Green.

HYBRID STATE OF CHARGE

Two LED clusters on either side of the cockpit display the current State of Charge in the hybrid Supercapacitor. When the system is not deploying, the LEDs will be colored red, yellow, and green to indicate the state of charge. A full charge is all eight LEDs illuminated with lights extinguishing as charge is depleted. The lights will keep this color scheme during energy regeneration.

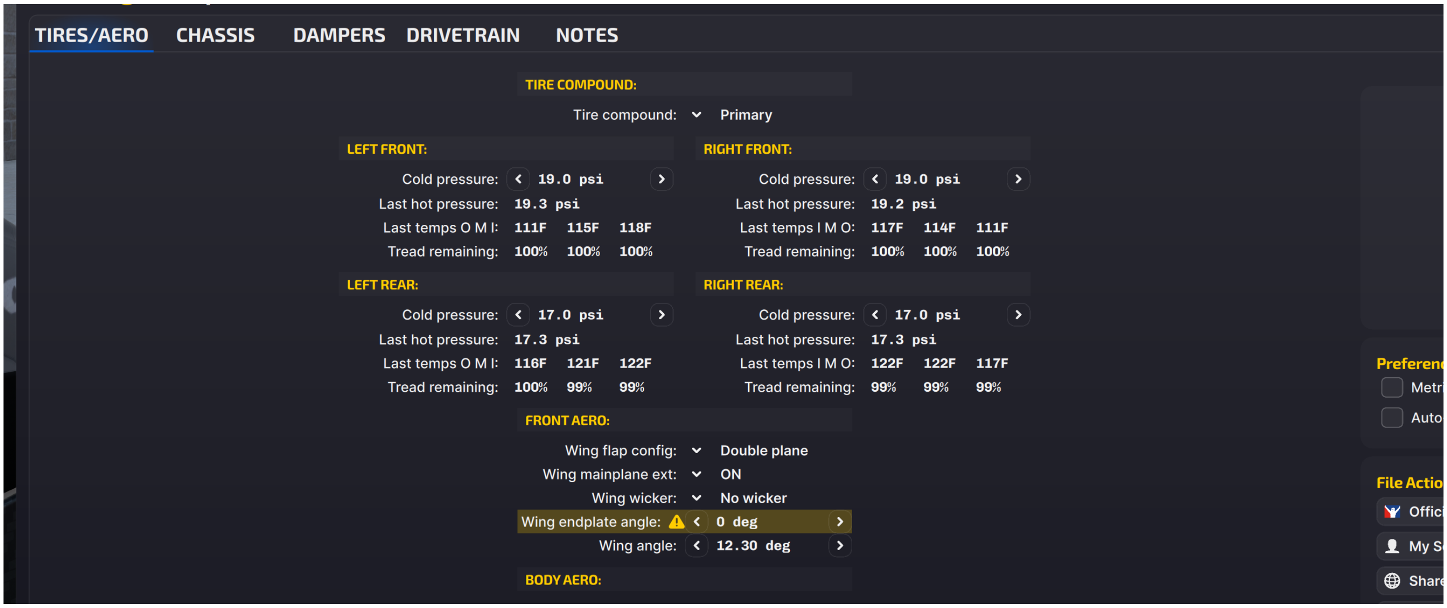
When the system is deploying energy, the lights will change to 7 blue and 1 red LED but still display the system's State of Charge

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 DATA



TIRE COMPOUND

For road courses the IR18 allows one of two tire compounds to be used. The Primary compound is harder, providing less grip but longer tire life, while the Alternate compound is softer, providing more grip but shorter tire life. This option is not allowed on ovals.

COLD 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. Minimum pressures will change based on track type, with ovals typically having a higher right-side minimum tire pressure than the left-side tires.

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. Careful attention should be paid to the Hot Pressures to extract the most performance out of the tires during a race.

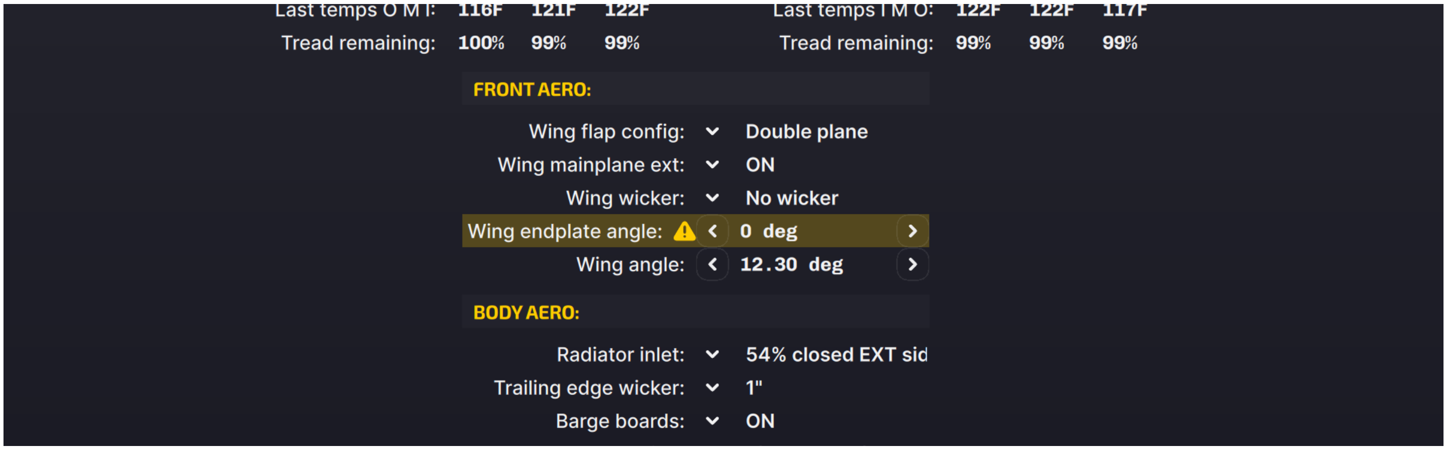
LAST TEMPS O M I

The temperatures measured in the garage are tire carcass temperatures, measured within the tread rubber itself. Wheel Loads and the amount of work a tire is doing on the 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 and tire air pressure while on track.

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, but should never be prioritized over tire temperatures when analyzing handling balance.

FRONT AERO



WING FLAP CONFIG

The number of front wing upper flaps is mandated per Indycar rules based on the track type. For Road Courses the wing will have two upper flaps and for Ovals the front wing will have one upper flap.

WING MAINPLANE EXT

The Wing Mainplane Extension adds small elements to the front wing's mainplane to increase downforce generated by the wing assembly. Changing this setting to "ON" will increase Front downforce and slightly increase drag, while setting this to "OFF" will shift aero balance rearward and decrease drag slightly. See the "Wing Wicker" section for more information on this feature.

WING WICKER

A small wicker (or "Gurney Flap") can be added to the trailing edge of the front wing upper-most flap. The options available for this setting are track dependent:

-Road Course - A single wicker on the uppermost front wing flap is allowed

-Large Oval, no Wing Mainplane Extension - A wicker may be added to the front wing trailing edge. The wicker can be added in "Steps", with each step indicating how many thirds of the front wing span has a wicker on it. For example, the Step 2 wicker will cover 2/3 of the front wing span, Step 3 will be a full-span wicker.

-Large Oval, Wing Mainplane Extension - If the Wing Mainplane Extension is installed, Steps 2 and 3 are not an option. If no wicker is chosen, the Wing Mainplane Extension will span the inner half of the front wing. If the Step 1 wicker is chosen, an outer extension and wicker will be installed, creating a full-span Mainplane Extension with a small wicker on the outer half.

-Short Oval - Wicker not allowed.

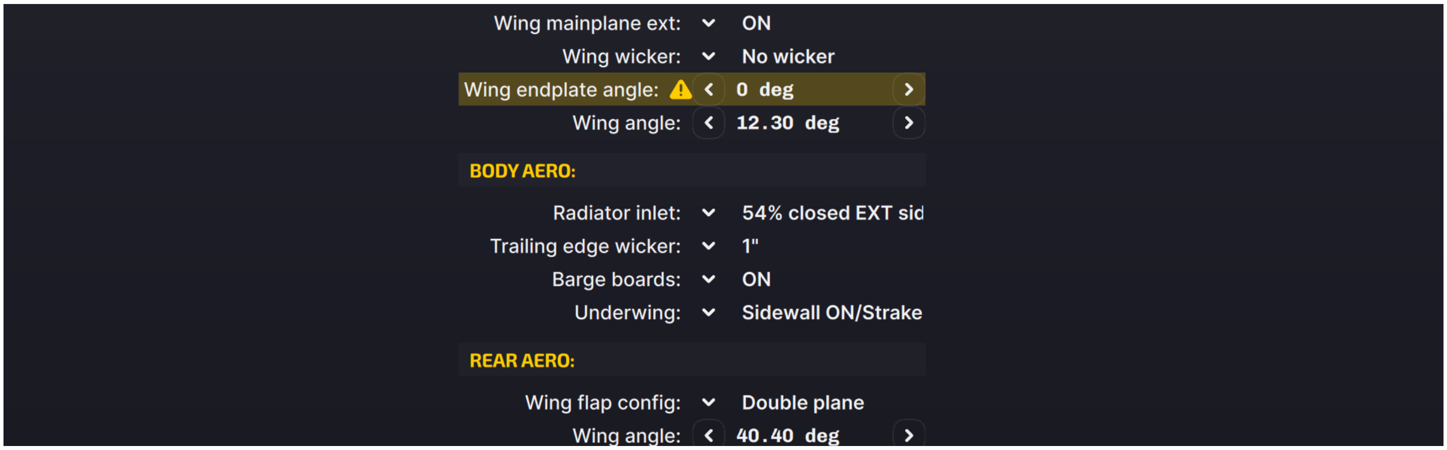
WING ENDPLATE ANGLE

The wing endplate assembly can be rotated relative to the wing mainplane up to 3° positive or negative. Higher Wing Endplate Angles will increase downforce and shift aero forward, but also change what Wing Mainplane angles are available. Higher Endplate Angles will allow for higher Wing Mainplane angles (but also a higher minimum angle) while lower Endplate Angles will allow for much lower Mainplane angles. This option is not available for Road Courses and Short Ovals.

WING ANGLE

The Wing Angle setting changes the angle of the front wing's mainplane relative to horizontal. Higher angles will increase the downforce generated at the front wing, shift aero forward, and increase drag, while lower angles will decrease downforce, shift aero rearward, and reduce drag. Depending on the chosen Wing Endplate Angle, it is possible to run negative front wing angles. These settings still produce some downforce, but greatly reduce drag for high-speed ovals such as Indianapolis.

BODY AERO



RADIATOR INLET

Both sidepod inlets can be blocked off partially to decrease drag when desired. Decreasing the opening size (More “closed” percentage in the garage setting) will reduce drag with a slight reduction in downforce, but will increase engine temperatures due to reduced cooling. The 77% Closed option is only available for Qualifying sessions and is not allowed for Race sessions.

TRAILING EDGE WICKER

A 1” tall wicker can be installed on the upper edge of the rear diffuser at Road Courses and Short Ovals to increase downforce and shift aero rearward, but will increase drag. This option is not available for Large Ovals.

DIFFUSER

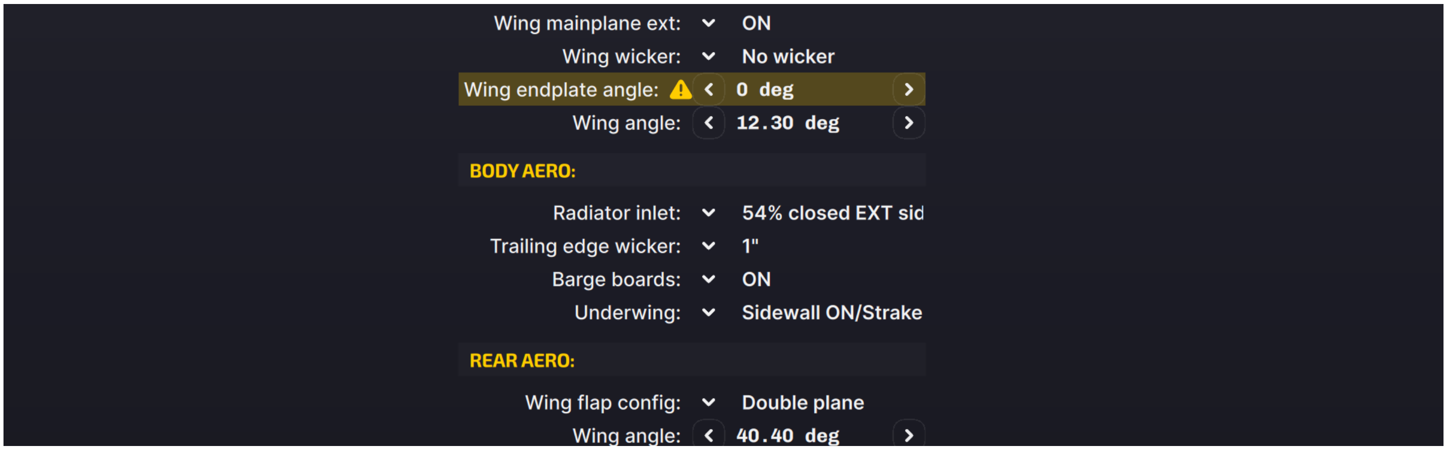
The rear diffuser assembly can be customized via three options:

Sidewalls - The outermost walls of the diffuser can be installed, removed, or trimmed to change the overall downforce and drag produced by the diffuser. Removing the sidewalls will reduce drag with a large reduction in downforce. “Trimmed” sidewalls are partially-removed sidewalls and provide more downforce than “OFF”, but less than “ON”.

Strakes - The diffuser can be fitted with internal vertical Strakes to increase the diffuser’s efficiency and downforce produced. Installing the diffuser strakes will increase downforce and drag. A third option, “Z+15” installs a 15mm extension to the bottom of the diffuser strakes to further increase downforce.

For Large Ovals the options for the diffuser are mandated so that both the Sidewalls and Strakes are off.

REAR AERO



WING FLAP CONFIG

For Road Courses, the rear wing can be configured with one or two upper flaps. The Double Plane configuration will generate a significant amount of downforce and shift aero rearward at the cost of high drag, while the Single Plane option will greatly reduce both downforce and drag but shift aero forward. For ovals, only the Single Plane option is available.

WING ANGLE

The Rear Wing Angle setting controls the angle of the rear wing's uppermost flap. Higher angles will produce more downforce, more drag, and shift aero rearward, while lower angles will reduce both downforce and drag but shift aero forward. Available wing angle ranges will change based on the wing assembly (Road Course/Short Oval or Large Oval) as well as the number of flaps chosen in the Flap Config setting.

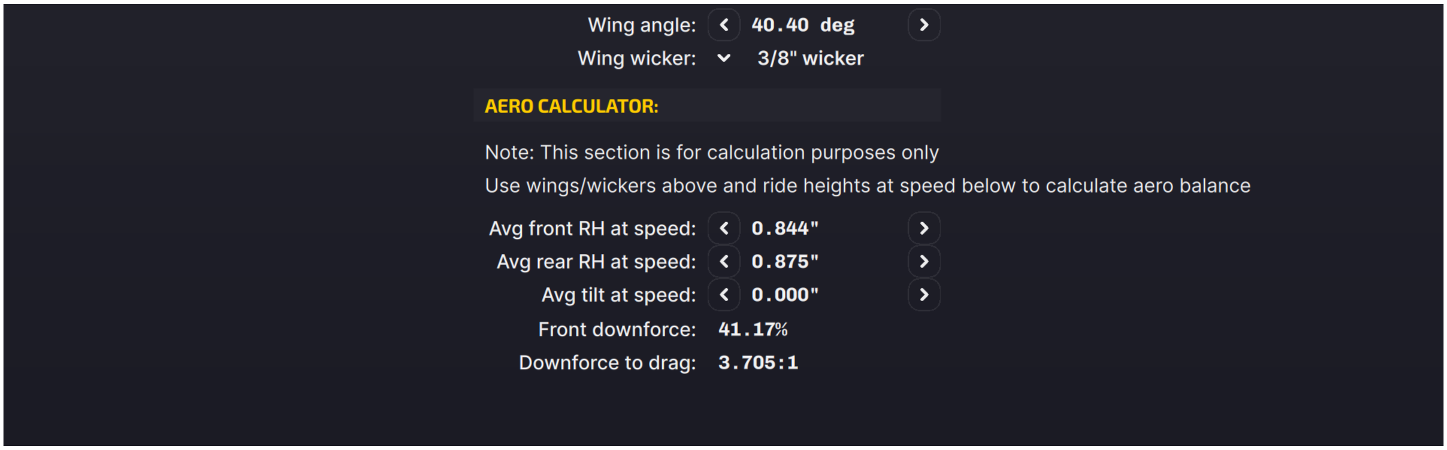
WING WICKER

A trailing edge wicker may be installed on the rear wing for most tracks. This adds downforce and shifts aero rearward, but adds drag. The rules on what can be used are track-dependent:

Road Course / Short Oval - Can be run without a wicker or with a full-span ⅜" wicker

Large Ovals (except Indianapolis) - Rear wing wicker is not allowed
Indianapolis Motor Speedway Oval - A wicker can be installed on the rear wing at Indianapolis that is ⅜" tall but has various widths of 13.2 inches, 24.5 inches, or a full-span wicker. This wicker is situated on the centerline of the wing and extends equally on either side of the centerline. This wicker can be removed as well, such as in Qualifying when opting for a very low-drag configuration.

AERO CALCULATOR



The Aero Calculator is a tool provided to aid in understanding the shift in aerodynamic balance associated with adjustment of the rear wing setting and front and rear ride heights. It is important to note that the values for front and rear ride height displayed here DO NOT result in any mechanical changes to the car itself, however, changes to the rear wing angle here WILL be applied to the car.
This calculator is a reference tool ONLY.

AVG FRONT / REAR RH AT SPEED

The Ride Height (RH) at Speed settings are inputs for the aero calculator to determine the approximate aero performance with the chosen aero package. Changing these values changes the displayed Front Downforce value as well as the Downforce-to-Drag ratio in the calculator. To check on-track performance, use the average of the front ride height sensors (Front RH) and the average of the rear ride height sensors (Rear RH) from telemetry. These can also be changed to observe how rake will affect aerodynamic performance prior to ride height or spring changes.

AVG TILT AT SPEED

The Tilt at Speed setting is a value of how much the chassis is rolled left or right. For best results, calculate (from on-track telemetry data) an average of the left-side ride heights and an average of the right-side ride heights. The difference between these averages is the Tilt at Speed value to use in the calculator.

AERO BALANCE

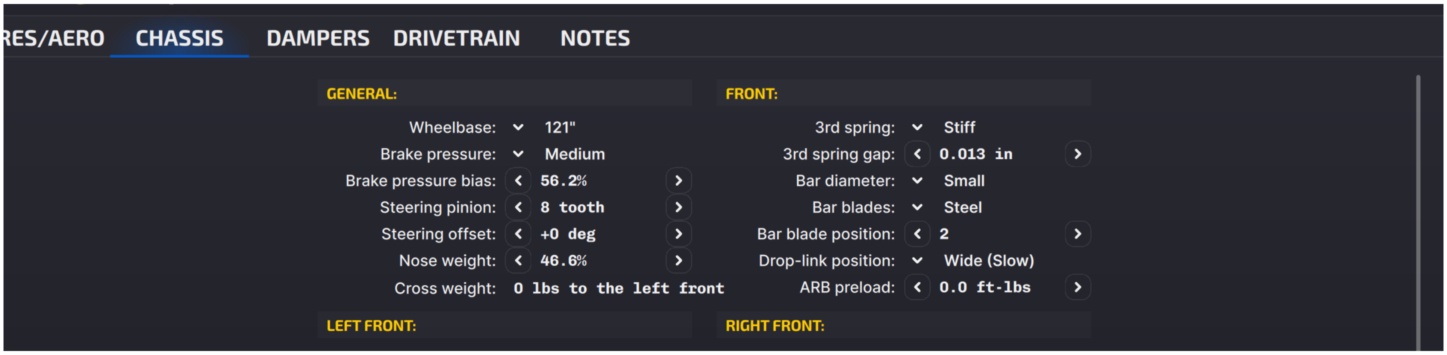
Aero Balance represents the percentage of total downforce that is working on the front axle. This value is calculated with the At Speed ride height and tilt values, as well as the chosen aerodynamic options, and should be monitored during the chassis setup process to prevent unexpected results. To ensure chassis adjustments don't become masked by aerodynamic changes, always refer to this value to ensure it remains constant before and after aerodynamic setup changes.

DOWNFORCE TO DRAG

The Downforce to Drag ratio is a relation of how much downforce is produced for one unit of drag. Generally, a larger Downforce to Drag ratio would imply the car is working efficiently and producing large amounts of downforce for given drag numbers, while a lower Downforce to Drag value is typically seen on more slippery, low-drag aerodynamic packages.

CHASSIS

GENERAL



WHEELBASE

For some track configurations the overall wheelbase can be adjusted to change the car's handling behavior and responsiveness. On Large Ovals and Indianapolis, the wheelbase can either be set to 121 or 119 inches. The longer option will result in a more directionally-stable car that is less responsive, but less sensitive to aero balance and longitudinal weight shifting. The shorter option will be more responsive, which is good for tighter corners, but will be more sensitive to fore-aft aero and weight shifting. For Road Courses and Short Ovals, the only option available is the 121 inch setting.

BRAKE PRESSURE

If overall downforce is increased or decreased, the overall braking pressure may need to be changed to suit. Generally, higher downforce levels can use higher braking pressures without wheel lockups, while lower downforce levels will need reduced brake pressures.

BRAKE PRESSURE BIAS

The Brake Pressure Bias setting determines how much of the overall brake line pressure is sent to the front wheels. Higher percentages apply more braking pressure to the front wheels which can induce understeer under braking, while reducing the percentage will shift braking force rearward and induce oversteer under braking. If the bias is set too far forward or rearward it can cause wheel lockups under heavy braking, so it should be set to a value that allows for heavy braking without lockups on either axle.

STEERING PINION

To fit various driver preferences, the Steering Pinion can be changed to alter how fast or responsive the steering is. Higher pinion teeth numbers will result in a faster steering response which can make the car feel more twitchy with small steering inputs, while lower pinion values will slow the steering and make it less responsive to inputs.

STEERING OFFSET

On oval tracks it's not uncommon for the chassis to be set up asymmetrically, causing the car to pull to one side and the driver to hold some amount of opposite steering to counter it. If desired, the Steering Offset setting can be changed to center the steering wheel down the straights. Positive values will reposition the steering wheel in a clockwise direction, negative values will position the steering wheel in a counter-clockwise direction.

NOSE WEIGHT

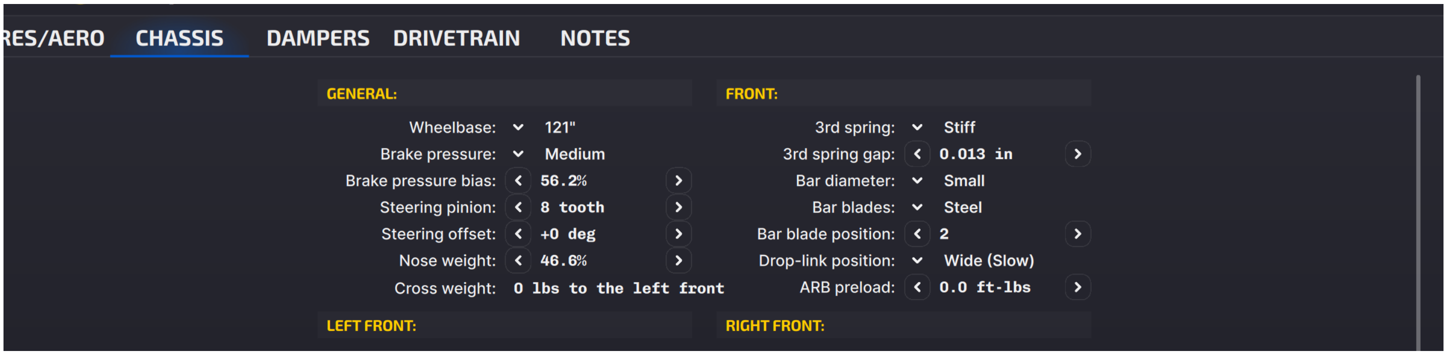
Nose Weight is the percentage of the vehicle's total weight that is situated on the front axle. This is used primarily to balance front-to-rear aero distribution, and in most cases will produce a directionally-stable car when set higher than the aero balance percentage. Less Nose Weight will shift weight rearward, inducing oversteer as well as helping the car change directions more easily. More Nose Weight will create a more directionally-stable chassis, but can induce understeer if set too far forward.

CROSSWEIGHT

Crossweight is the percentage of the car's total weight situated over the Right-Front and Left-Rear wheels. For the IR18, this value is represented as a difference in weight across the front axle relative to the Left-Front wheel. For example, if the readout shows "-100 (lbs or N) to the Left Front", the Right-Front wheel has 100 lbs or Newtons more than the Left-Front wheel when in the garage. Higher Cross Weight values (Lower or More Negative to the Left-Front) will induce understeer in left-hand corners and oversteer in right-hand corners. Lower Cross Weight values (Higher to the Left-Front) will induce oversteer in left-hand corners and understeer in right-hand corners.

CHASSIS

FRONT



3RD SPRING

For Road Courses a Third Spring element, in the form of a polymer bump stop, can be added to the suspension. This element works only in heave (vertical suspension travel) and can be set to prevent the car from dropping too far under heavy aerodynamic loads or vertical forces from track shape, such as dips or turn banking. Using the Third Spring in this way allows for softer corner springs to be used (since they won't have to carry the full aerodynamic loads), increasing mechanical grip while cornering. The Third Spring is not available on Ovals.

3RD SPRING GAP

The Third Spring Gap is the distance the third spring element must compress before the third spring bump stop is engaged with higher gap values requiring more vertical travel before engagement. The Third Spring is a polymer bump stop and thus increases in rate as it is compressed, with low compression values having low spring rate and high compression values having a very high spring rate. This can be used to fine-tune the suspension's behavior over bumps in the track surface at high speeds and high aerodynamic loads to help reduce changes in wheel load in these situations.

BAR DIAMETER

The front Anti-Roll Bar is available in three options: Large diameter, Small diameter, and None (ARB removed). The Large diameter option will stiffen the front suspension in roll, reducing mechanical grip and inducing understeer, but will try to keep the chassis flatter when cornering. The Small diameter option will reduce roll stiffness, increasing mechanical grip across the front axle and reducing understeer, but will allow the chassis to roll more. Removing the ARB will dramatically reduce roll stiffness but can provide a large increase in front end mechanical grip and increase oversteer. If the ARB is removed, all other front ARB settings have no effect on the chassis.

BAR BLADES

The front ARB bar blades can be made of either Steel or Titanium (Ti) to alter the stiffness of the ARB assembly. The Steel blades are stiffer, slightly increasing roll stiffness can induce understeer. The Titanium blades are softer and will slightly reduce roll stiffness, which can reduce understeer. This adjustment has no other effect on the chassis, such as one option being lighter than the other.

BAR BLADE POSITION

The ARB blade orientation can be changed to one of six options to alter the stiffness of the ARB assembly. Represented numerically from softest (1) to stiffest (6), higher values result in a stiffer ARB while lower values soften the ARB. Stiffer settings will induce understeer while softer settings will reduce understeer. This adjustment is available as an in-car adjustment in the F8 Black Box as "ARB F".

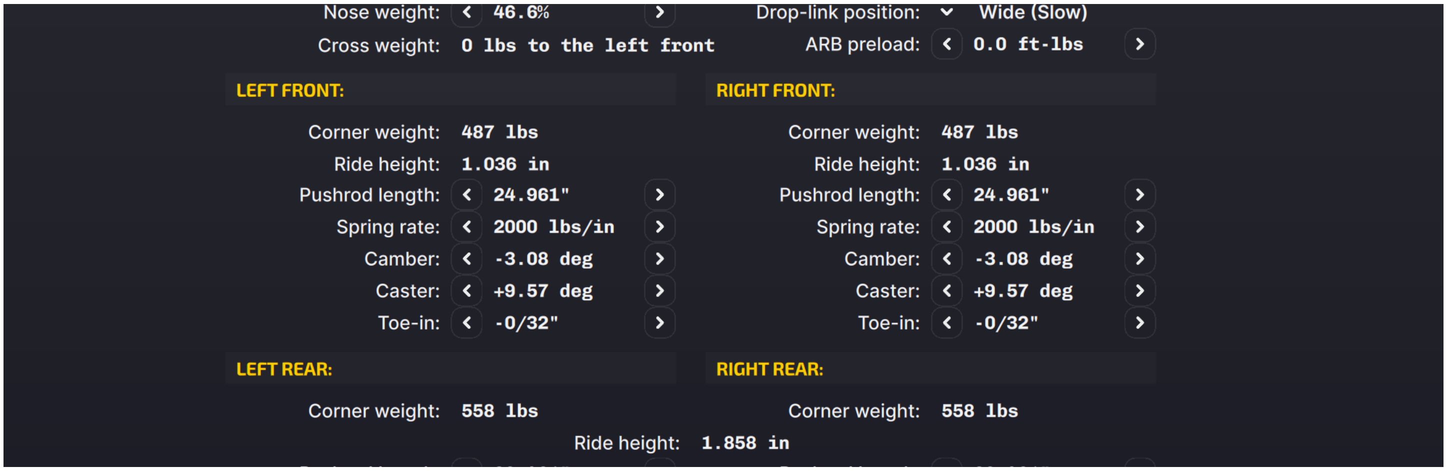
DROP-LINK POSITION

The ARB drop-links can be mounted in one of two positions that will alter the ARB stiffness. The "Wide (Slow)" option will reduce how fast the ARB is loaded, reducing the effective stiffness of the ARB assembly and reducing understeer. Changing to the "Narrow (Fast)" option will speed up the ARB, increasing effective stiffness and increasing understeer.

ARB PRELOAD

Adjustments to the chassis will often result in small static loads being applied to the ARB assemblies. The ARB Preload setting can be used to remove these loads to prevent any asymmetric behavior from the ARB. On Ovals it can be used to apply a static load to the bar and manage crossweight changes in banking transitions.

FRONT CORNERS



CORNER WEIGHT

Corner Weight represents the weight on each wheel when sitting in the garage. This can be used to visualize the weight distribution under static conditions and help with identifying changes to weight distribution through the setup process.

RIDE HEIGHT

Front Ride Height is a measurement from the ground to a reference point on the chassis projected to the center of the front axle. Since this value doesn't necessarily represent the lowest point on the chassis it does not specifically represent the chassis' ground clearance, but is instead a reference for setup and aero work. It is important to have the ride height low for both aero and mechanical grip, but high enough that the chassis doesn't make significant contact with the race track over the course of a lap. Raising and lowering the front ride height will affect aerodynamic balance, overall downforce levels, and drag, so consult the Aero Calculator to see how a ride height change will influence handling when changing this value.

PUSHROD LENGTH

To adjust the Ride Height, shims can be added to or removed from the front suspension push rods to change their length. This is a very fine adjustment, however close attention should be paid to Corner Weights and Cross Weight, especially when making asymmetric adjustments, to ensure weight distribution isn't altered while changing the Pushrod Length.

SPRING RATE

Spring Rate is the stiffness of the suspension's corner springs controlling each wheel. The value is a representation of how much force (Pounds or Newtons) required to compress the spring a specific distance. Springs are used to keep the chassis from contacting the track under the loads seen on track and to manage the chassis' aerodynamic attitude, but their stiffness also has a major influence on the car's handling characteristics. On the front end, stiffer springs can keep the front wing from moving too much under increasing aerodynamic loads but will decrease mechanical grip and can cause understeer in slower corners. Softer springs will result in more front end movement, which can hurt aero, but will increase mechanical grip in the front axle and reduce understeer (or cause oversteer, in extreme cases).

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. Higher negative camber values will provide more cornering forces in the direction of the tire's camber (more aggressive turn-in response), but may reduce braking capability at high camber angles.

Since the Dallara IR18 runs on both ovals and road courses, the desired camber settings will change between track types. For road courses it is best to have all four wheels set to negative camber values. For Ovals, the right-side tires should be set to negative camber values while the left-side tires should be set to positive values. The difference in camber values on ovals will often change from track to track due to varying levels of load seen on each tire. Generally, if a tire sees less load it will not be able to work with as much camber as a more heavily-loaded tire.

CASTER

Caster is the angle between vertical and a line drawn through the upper and lower ball-joints on the front suspension, essentially representing the steering axis of the front suspension. Positive caster indicates the upper ball joint is farther back than the lower ball joint, while negative caster would indicate the upper ball joint is ahead of the lower ball joint but this is not allowed on the IR18. Caster can have many effects that must be considered during the setup process.

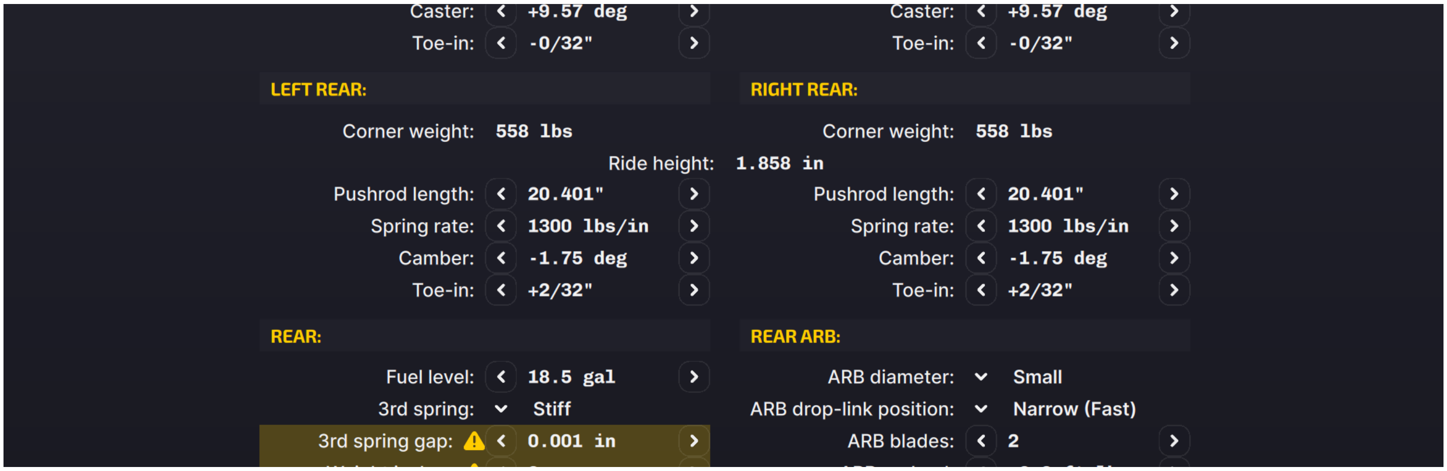
Increasing caster will increase the pneumatic trail effect in the tire, which will impart directional stability and create a steering feel that seems "heavier" to the driver, with the steering wanting to straighten itself as steering input is released. It will also introduce suspension jacking forces as the angle is increased, causing more load to be shifted to the inside front wheel when the steering is turned. This decreases crossweight on turn-in and mechanically helps to turn the car in but this also increases how much the chassis rolls to the outside when steering is applied. This effect can be very helpful in slow corners, however in high-speed corners the aero effect caused by the chassis roll can be detrimental. Decreasing the caster will have the opposite effect for all conditions created by increasing the caster value.

For Ovals it will often be desirable to run asymmetric caster values, with the left-front wheel running a lower amount of positive caster than the right-front wheel. This results in a natural tendency for the chassis to steer to the left as well as decreasing crossweight on turn-in, which can be very beneficial for ovals. However, as caster increases there is a small increase in rolling drag on the tire, which can be detrimental for large ovals where top speed is crucial.

TOE-IN

Toe is the angle of the wheels relative to the chassis centerline when viewed from above. Negative toe-in sets the front of the tires farther from the centerline than the rear of the tires while positive toe-in sets the front of the tires closer to the centerline than the rear of the tires. This setting can change the front tire slip angle in a turn, with toe-out providing better turn-in response but less straight-line stability and increased tire temperature and wear. Lower toe values can provide a quicker steering response, but may produce an unstable steering feeling. Due to highly asymmetric loading on ovals, it's not uncommon to have wildly different front Toe values on each front wheel to manage slip angle under loads. Generally, the right-front wheel will be able to utilize more toe-out than the left-front since it will see a much higher load in the corners.

REAR CORNERS



CORNER WEIGHT

Corner Weight represents the weight on each wheel when sitting in the garage. This can be used to visualize the weight distribution under static conditions and help with identifying changes to weight distribution through the setup process.

RIDE HEIGHT

Rear Ride Height is a measurement from the ground to a reference point on the chassis centerline. For the garage, only one rear ride height is shown while telemetry output will show two rear corner heights similar to the front heights. Since this value doesn't necessarily represent the lowest point on the chassis it does not specifically represent the chassis' ground clearance, but is instead a reference for setup and aero work. It is important to have the ride height low for both aero and mechanical grip, but high enough that the chassis doesn't make significant contact with the race track over the course of a lap. Raising and lowering the rear ride height will affect aerodynamic balance, overall downforce levels, and drag, so consult the Aero Calculator to see how a ride height change will influence handling when changing this value.

PUSHROD LENGTH

To adjust the Ride Height, shims can be added to or removed from the rear suspension push rods to change their length. This is a very fine adjustment, however close attention should be paid to Corner Weights and Cross Weight, especially when making asymmetric adjustments, to ensure weight distribution isn't altered while changing the Pushrod Length. For the rear it is especially important to pay attention to the corner weights since changes to left-to-right tilt can't be identified due to only having one ride height value for the rear.

SPRING RATE

Spring Rate is the stiffness of the suspension's corner springs controlling each wheel. The value is a representation of how much force (Pounds or Newtons) required to compress the spring a specific distance. Springs are used to keep the chassis from contacting the track under the loads seen on track and to manage the chassis' aerodynamic attitude, but their stiffness also has a major influence on the car's handling characteristics. On the rear end, stiffer springs can keep the rear of the car from moving too much under increasing aerodynamic loads but will decrease mechanical grip and can cause oversteer in slower corners. Softer springs will result in more rear end movement, which can hurt aero, but will increase mechanical grip across the rear axle and reduce oversteer (or cause understeer, in extreme cases).

CAMBER

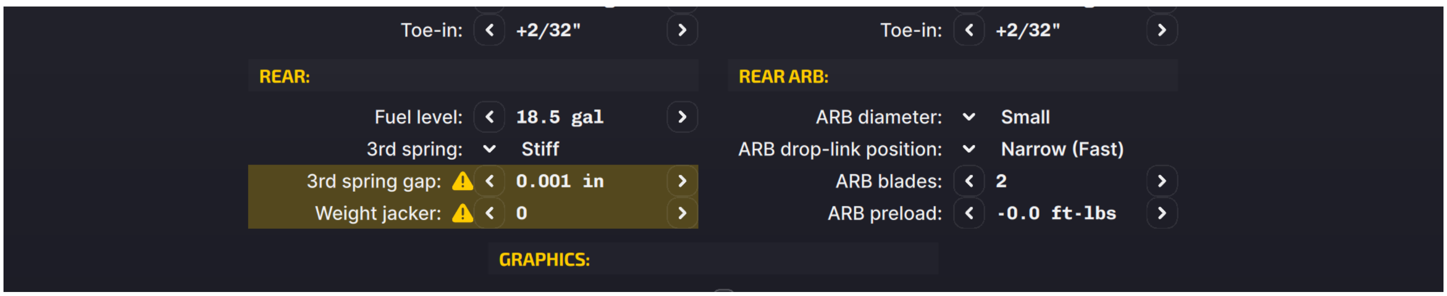
Camber is the vertical angle of the wheel relative to the center of the chassis. Negative camber is when the top of the wheel is closer to the chassis centerline than the bottom of the wheel, positive camber is when the top of the tire is farther out than the bottom. Higher negative camber values will provide more cornering forces in the direction of the tire's camber (more stability in high-speed cornering), but may reduce on-throttle traction at high camber angles.

Since the Dallara IR18 runs on both ovals and road courses, the desired camber settings will change between track types. For road courses it is best to have all four wheels set to negative camber values. For Ovals, the right-side tires should be set to negative camber values while the left-side tires should be set to positive values. The difference in camber values on ovals will often change from track to track due to varying levels of load seen on each tire. Generally, if a tire sees less load it will not be able to work with as much camber as a more heavily-loaded tire.

TOE-IN

Toe is the angle of the wheels relative to the chassis centerline when viewed from above. Negative toe-in sets the front of the tires farther from the centerline than the rear of the tires while positive toe-in sets the front of the tires closer to the centerline than the rear of the tires. This setting can change the rear tire slip angle, with toe-in providing more straight-line stability but reduce the car's tendency to rotate into a corner. Lower toe-in values (moving towards toe-out) can provide a quicker steering response, but may produce an unstable steering feeling. Due to highly asymmetric loading on ovals, it's not uncommon to have wildly different rear Toe values on each front wheel to manage slip angle under loads. Rear-steer can also be influenced by the rear Toe values by toeing out the right-rear wheel and toeing in the left-rear wheel. This will increase yaw in corners, which can provide aerodynamic benefits at high speed, but can induce oversteer on throttle application.

REAR



FUEL LEVEL

This shows how much fuel will be in the fuel tank when the car is loaded in the sim.

3RD SPRING

For Road Courses a Third Spring element, in the form of a polymer bump stop, can be added to the suspension. This element works only in heave (vertical suspension travel) and can be set to prevent the car from dropping too far under heavy aerodynamic loads or vertical forces from track shape, such as dips or turn banking. Using the Third Spring in this way allows for softer corner springs to be used (since they won't have to carry the full aerodynamic loads), increasing mechanical grip while cornering. The Third Spring is not available on Ovals.

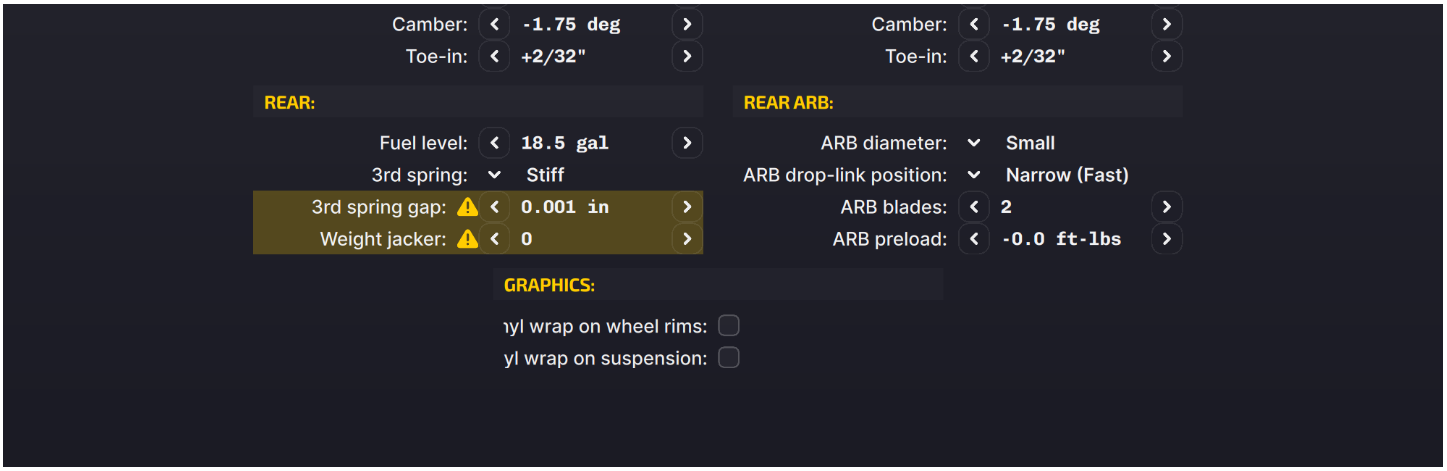
3RD SPRING GAP

The Third Spring Gap is the distance the third spring element must compress before the third spring bump stop is engaged with higher gap values requiring more vertical travel before engagement. The Third Spring is a polymer bump stop and thus increases in rate as it is compressed, with low compression values having low spring rate and high compression values having a very high spring rate. This can be used to fine-tune the suspension's behavior over bumps in the track surface at high speeds and high aerodynamic loads to help reduce changes in wheel load in these situations.

WEIGHT JACKER

The Weight Jacker is a device mounted to the right-rear spring that can be used to adjust the cross weight while in the car. Positive values will preload the spring and decrease the crossweight while negative values will unload the spring and increase the crossweight. The corresponding ride height changes will occur as well, with positive values raising the right-rear and negative values lowering the right rear. This adjustment is not available on road courses, and must be set to zero for the car to pass tech in the garage, but is available as an in-car adjustment on the F8 Black Box as "Weight Jacker".

REAR ARB & GRAPHICS



ARB DIAMETER

The rear Anti-Roll Bar is available in three options: Large diameter, Small diameter, and None (ARB removed). The Large diameter option will stiffen the rear suspension in roll, reducing mechanical grip and inducing oversteer, but will try to keep the chassis flatter when cornering. The Small diameter option will reduce roll stiffness, increasing mechanical grip across the rear axle and reducing oversteer, but will allow the chassis to roll more. Removing the ARB will dramatically reduce roll stiffness but can provide a large increase in rear end mechanical grip and increase understeer. If the rear ARB is removed and the rear springs are too soft there is a chance of lifting the inside front tire on turn-in, which can result in a wheel lockup under braking. If the ARB is removed, all other front ARB settings have no effect on the chassis.

ARB DROP-LINK POSITION

The ARB drop-links can be mounted in one of two positions that will alter the ARB stiffness. The “Wide (Slow)” option will reduce how fast the ARB is loaded, reducing the effective stiffness of the ARB assembly and reducing oversteer. Changing to the “Narrow (Fast)” option will speed up the ARB, increasing effective stiffness and increasing oversteer.

ARB BLADES

The ARB blade orientation can be changed to one of six options to alter the stiffness of the ARB assembly. Represented numerically from softest (1) to stiffest (6), higher values result in a stiffer ARB while lower values soften the ARB. Stiffer settings will induce oversteer while softer settings will reduce oversteer. This adjustment is available as an in-car adjustment in the F8 Black Box as “ARB R”.

ARB PRELOAD

Adjustments to the chassis will often result in small static loads being applied to the ARB assemblies. The ARB Preload setting can be used to remove these loads to prevent any asymmetric behavior from the ARB. On Ovals it can be used to apply a static load to the bar and manage crossweight changes in banking transitions.

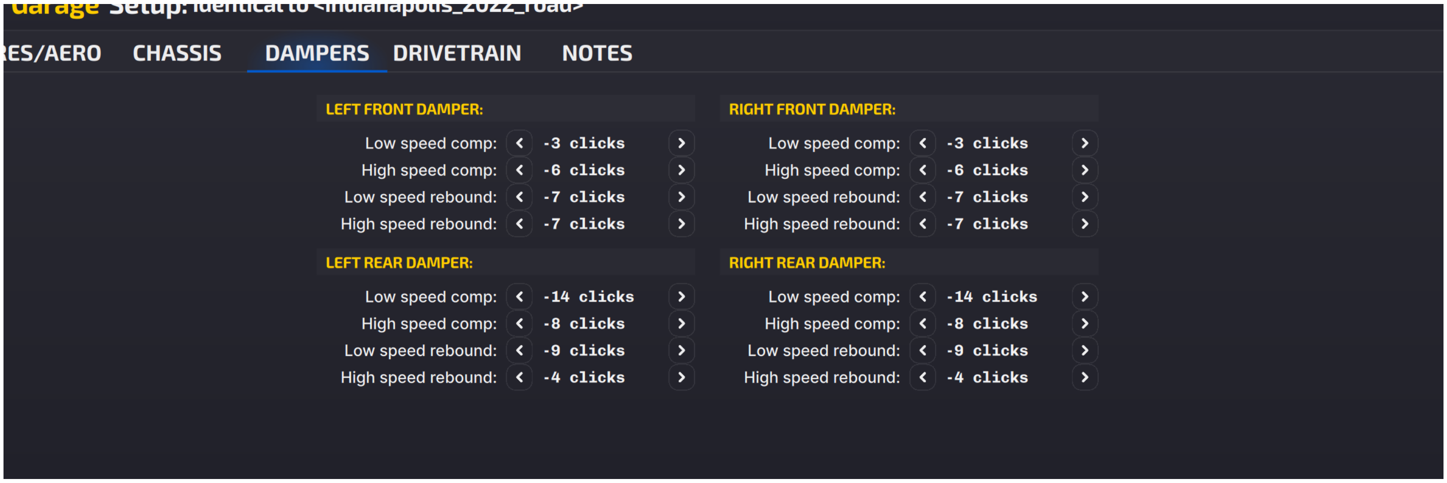
VINYL WRAP ON WHEEL RIMS

Checking the Vinyl Wrap on Wheel Rims will enable a section of the paint template and apply it to the wheel rims. This will result in the wheels showing a color other than what was chosen for the wheels in the iRacing Paint Booth. This has no effect on car performance.

VINYL WRAP ON SUSPENSION

Enabling Vinyl Wrap on Suspension will apply a section of the paint template to the suspension arms, replacing the Carbon Fiber texture with a solid color. This has no effect on car performance.

DAMPERS



LOW SPEED COMP

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 and building aerodynamic forces. Higher values will increase compression resistance under these low-speed conditions more quickly, lower values will result in a more compliant shock. From a mechanical grip standpoint, more front low-speed compression will produce understeer under braking while more rear low-speed compression can reduce on-throttle traction to help rotation. For aerodynamics, more low-speed compression will slow vertical movement of either end of the car under braking or acceleration.

HIGH SPEED COMP

High Speed Compression affects the shock's behavior in high-speed travel, usually attributed to kerb strikes and bumps in the track's surface. Higher compression values will cause the suspension to be stiffer in these situations (good for keeping the chassis from contacting the track), while lower values will allow the suspension to absorb these bumps better. Lower values will help with compliance over rough surfaces but may hurt the aerodynamic platform's consistency around the track.

LOW SPEED REBOUND

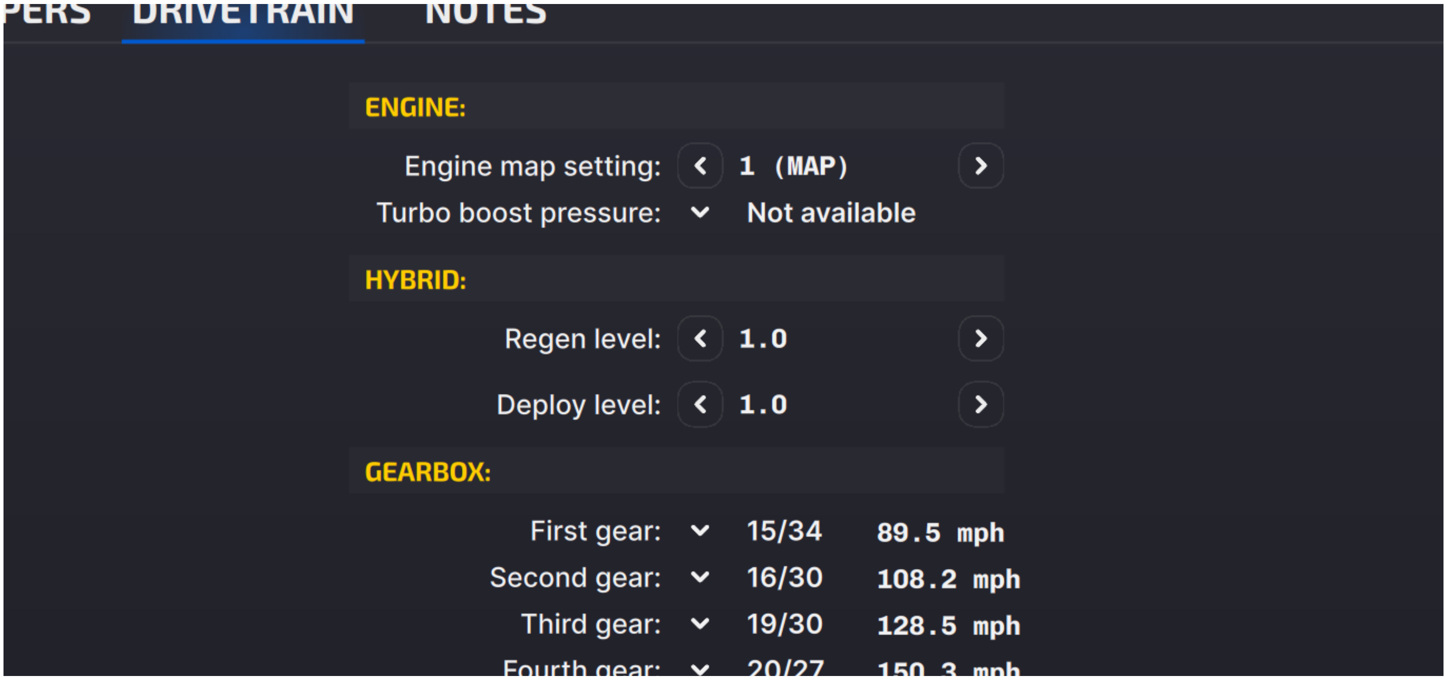
Low-speed Rebound damping controls the stiffness of the shock while extending at lower speeds, typically during body movement and changing aerodynamic loads. Higher rebound values will resist expansion of the shock, lower values will allow the shock to extend faster. Higher rebound values can better control aerodynamic attitude but can result in the wheels 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 while lower values will maintain front end grip longer, helping to reduce understeer. The rear is the opposite, with more low-speed rebound reducing rear grip under braking and less low-speed rebound will maintain rear grip better while the chassis is pitching forward. Lower rebound settings are usually better for tire wear but can be a detriment to aerodynamic consistency. Higher rebound can maintain a better aerodynamic platform, but can lead to unwanted oscillations due to the wheel bouncing off of the track surface when the suspension can't extend fast enough.

HIGH SPEED REBOUND

High-speed rebound adjusts the shock in extension over bumps and kerb strikes. Higher values will reduce how quickly the shock will expand, while lower values will allow the shock to extend more easily. This value should be set low enough that the wheels can return after a bump or kerb strike but not high enough that the tire becomes unloaded when the suspension can't expand.

DRIVETRAIN

ENGINE & HYBRID



ENGINE MAP SETTING

The Engine Map Setting can be used to alter the amount of fuel sent to the engine for fuel-saving purposes.

Setting 1 - This setting provides maximum power but the highest fuel consumption.

Settings 2-5 - These settings are used for saving fuel. Engine power is reduced as the setting value increases, but the amount of fuel used is also reduced.

Setting 6 - This setting is a full-power setting but with a more linear throttle map than settings 1-5 and setting 7.

Setting 7 - This will also provide full power, but with a more digressive throttle map than settings 1 and 6.

Setting 8 - Meant for cautions and pace laps, Setting 8 will dramatically reduce fuel flow and power.

TURBO BOOST PRESSURE

For the Indianapolis Motor Speedway oval the engine turbo can be set to a different mapping that will produce more power. This engine mode will generate more heat and use more fuel and isn't recommended for Race sessions.

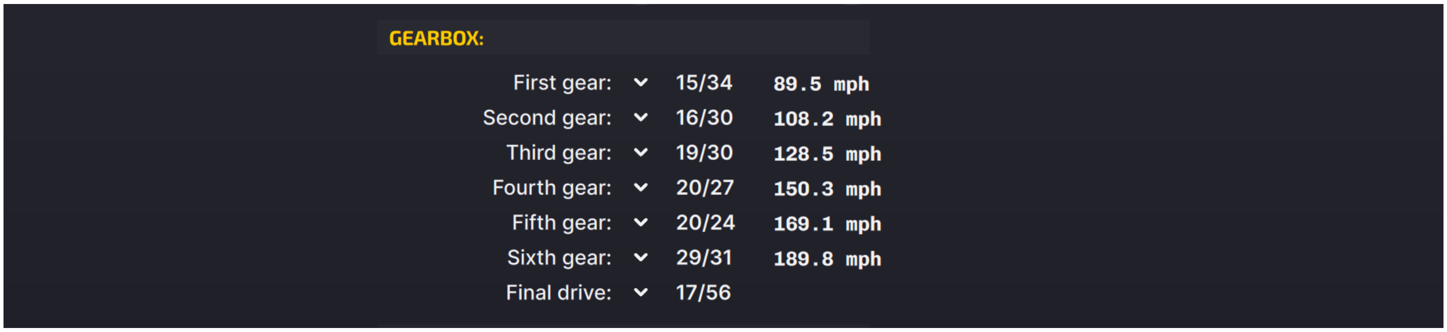
REGEN LEVEL

Sets how much automatic regeneration the hybrid system will have when lifting off the throttle, with 1.0 being full regen and values scaling down the rate from the full amount like a percentage (0.5 is 50% of full regen).

DEPLOY LEVEL

Sets how much the system will deploy under manual deployment activation. As with the Regen setting, 1.0 is full deployment and each setting below is a fraction of full.

GEARBOX



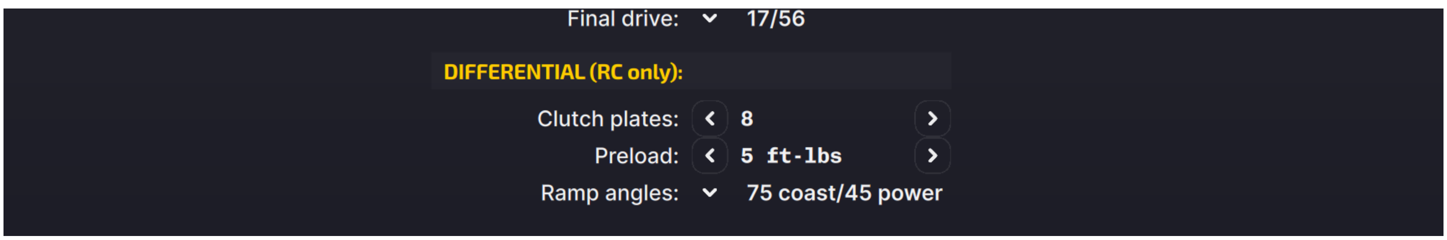
FIRST - SIXTH GEAR

All six gears in the transmission can be changed to suit track conditions or driver preferences. Each gear is represented by the ratio of teeth on the input and output gears, with lower ratios reducing acceleration but increasing top speed and higher ratios increasing acceleration but reducing top speed. Once a gear is chosen and the “Apply” button is pressed, the expected top speed the gear is capable of is updated beside the ratio choice.

FINAL DRIVE

The gear ratio on the differential is represented by the Final Drive ratio. This gear ratio alters the entire acceleration and speed profile of the car without changing the individual gears in the transmission. As with the transmission gears, higher ratios will increase acceleration but reduce top speed, while lower ratios will allow for a higher top speed but reduce acceleration. Changing the Final Drive gear and clicking “Apply” will update the maximum speed for all six transmission gears.

DIFFERENTIAL (RC ONLY)



The rear differential for the IR18 can be adjusted through multiple settings, all of which can greatly affect the car’s stability, on-throttle performance, and handling characteristics. These adjustments are only available at Road Course and Street Circuits, with the car running a non-adjustable Spool rear-end at Ovals.

CLUTCH PLATES

The differential Clutch Plates are a way to greatly increase the forces from the differential that attempt to keep the two rear axles locked in sync. The number of clutch plates used will multiply the locking force by the number of plates in use when compared to a single set of clutch plates. For example, 4 clutch plates will have 4 times the locking force of one plate, 12 will have 12 times, etc. Higher locking forces (more plates) will increase the amount of understeer seen when off the throttle under deceleration for corner entry, but will increase oversteer on exit when applying the throttle. Fewer plates will increase oversteer on corner entry while decelerating but add understeer when applying the throttle.

PRELOAD

Differential Preload is a static amount of locking force that is always present in the differential regardless of acceleration or deceleration. Increasing the preload will add understeer under braking but oversteer on throttle application, while decreasing preload will add oversteer under braking but understeer on throttle application.

RAMP ANGLES

The Ramp Angles are a way to tune the differential locking on deceleration and acceleration with various configurations.
The Ramp Angle values are split between “coast”, or deceleration, and “power”, or acceleration. Lower angle values will have more locking force for the situation that it is associated with, while higher angle values will have less locking force. For the “coast” adjustment, more locking force (lower ramp angles) will increase understeer while less locking force (higher angles) will increase oversteer.
On the “power” side, more locking force will add oversteer on throttle and less locking force will increase understeer. Since these adjustments are somewhat independent of one another and can be chosen independently, this is a great way to fine-tune corner entry and exit once the whole corner has been tuned with the Preload and Plate number.

SETUP TIPS

This section is aimed toward helping users who want to dive deeper into the different aspects of the vehicle's setup.

SETUP TIPS

GEARING

Final drive and individual gears can be adjusted to suit track characteristics. It is recommended you are close to the limiter at the endof the longest straight. Keep in mind that top speed may increase in draft and/or on push to pass, so allow for this RPM increase whenselecting gears.

AERODYNAMIC ADJUSTMENTS

Changing aero balance while adjusting front and rear flap angles together will add or remove downforce without significantly changing handling balance. If you note the aero balance percentage in the aero calculator before any changes you can add or remove overall downforce by matching that number after any changes, or purposely aim above or below the original percentage to change aerodynamic balance.

A higher aero balance value in the aero calculator indicates a more forward aero balance (loose/oversteer)
Mechanical Adjustments
Lower speed corners will not benefit as much from aerodynamic adjustments, so handling changes will come strictly from the suspension settings. The simplest adjustments to make are the ARB settings, which will greatly affect the handling balance without significantly compromising the aerodynamic platform

To add oversteer to low-speed corners, change to a smaller front bar or a larger rear bar. For a finer tuning adjustment, changing from Steel to Titanium blades will also induce oversteer. To induce understeer, run a larger front bar or a smaller rear bar, or switch from Titanium to Steel blades for a finer adjustment.

DIFFERENTIAL ADJUSTMENTS

Differential Preload will apply a static locking force to the differential and delay or extend the amount of time the rear differential is locked during acceleration and braking. This is an extremely effective adjustment to tune the car's handling behavior during throttle release and application without affecting the chassis.

-- A greater diff preload will decrease rotation under braking but increase on throttle rotation.
-- A lower diff preload will increase rotation under braking but decrease on throttle rotation.

RIDE HEIGHTS AND THIRD SPRING GAP

The IR18 may bottom out under heavy load. If you find the handling is being upset by the car bottoming, or bottoming on a straight is adding too much drag, you can raise the static ride height or decrease the third spring gap, however this may hurt aerodynamic efficiency.

Raising ride height is achieved by increasing both the left and right pushrod length. Keep in mind that if the front and rear ride heights are not adjusted equally you will alter the aero balance. (This can be observed using the aero calculator) The ride heights will also increase slightly over the course of the race as fuel burns off and the car becomes lighter.

Decreasing the third spring gap makes the progressive bump rubbers engage earlier which increases functional spring rate.
This can keep the car from bottoming under load, however excessive bump rubber engagement at mid-corner can cause handling instability over rough surfaces.