HYPER RACER X1
USER MANUAL

HYPERRACER.COM

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HYPER RACER X1 SERVICE INTERVAL CHART

Maintenance Schedule		Each Session	Each Track Day	3-4 Track Days	10 Track Days	Yearly
ENGINE OIL	Check Level	X				
	Replace			X		
OIL FILTER	Replace				X	
CHAIN	Lubricate	X				
	Replace				X	
SPARK PLUGS	Replace					X
FUEL CAP O-RING	Lubricate			X		
THROTTLE CABLE	Replace					X
SHIFT CABLE	Replace					X
AIR FILTER	Replace					X

ENGINE INFORMATION

The engine temperature operating window, as measured by the coolant temp, which can be displayed on the AIM dashboard, is **65-110 degrees**.

Warming Up:

1. The engine should be started 45 minutes prior to going on track. Turn the engine off when the coolant temperature reaches 85°C and allow heat to soak into the engine. Restart 5 minutes before going on track and raise the coolant temperature back up to 75°C.

2. The oil level should be checked after every hour of running, and it should be topped up as per page 7 of this User Manual.

Rev Limit:

The engine is rev limited to **10,500 RPM** set by the ECU.

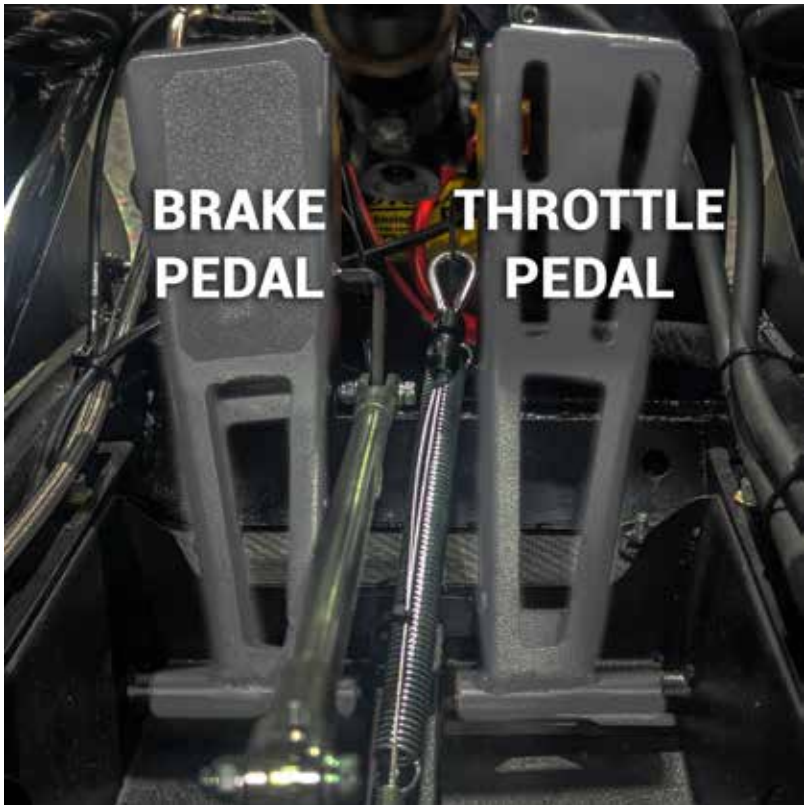
The shift lights display RPM from 8,500 to 10,000 in a sequence of green, orange and red lights. The lights will flash red at **10,000 RPM**.

WARNING: When downshifting through the gears, never exceed 10,500 RPM. This will cause catastrophic engine failure.

BASIC CONTROLS

The basic controls include the steering wheel, gear lever and clutch handle.

Additionally, the brake pedal and throttle pedal are located in the foot well of the X1.



THREAD LOCKER, ANTI-SEIZE, AND THREAD GREASE

THREAD LOCKER

The use of a thread locker is required in areas of the car that are high in vibration. Failure to use thread locker in the areas specified below can cause catastrophic failure. These bolts should also be checked regularly.

THREAD LOCKER BOLT LIST:

Skid Plate - M6 HHCS (Hex Head) - Blue 243 or medium strength.
Engine Cover - M5 HHCS (Hex Head) - Blue 243 or medium strength.
Rear Wing End Plate - M6 FSCS (Countersunk/flathead) - Blue 243 or medium strength.
Gear Lever Pivot Bolt - Blue 243 or medium strength.
Rear Sprocket Bolts - M10 SHCS (Socket Head) - Red 263 or high strength.
Brake Calliper Mounting Bolts - 3/8” UNF SHCS (Socket Head) - Red 263 or high strength.
Brake Rotor Bolts - 8x25mm SHSS (Shoulder bolt) - Red 263 or high strength.
Rear Tunnel Mounting Bolts - M6 SHCS (Socket head) - Red 263 or high strength.

ANTI-SEIZE

Bolts that thread directly into the steel chassis require the use of an anti-seize or copper grease, this will prevent corrosion and bolt seizure.

THREAD LUBRICATION

Unless a bolt is specified to have Loctite/Thread locker applied to it, any bolts being installed into aluminium componentry must have an appropriate thread grease applied.

ENGINE OIL

Use any high-performance oil recommended for the Suzuki Hayabusa engine. Hyper Racer recommends Castrol Edge Supercar Engine Oil 10W-60. The Suzuki Hayabusa engine oil quantity is aprox 4L.

READING THE OIL SIGHT GLASS

The oil sight glass is located on the lower rear side of the engine and is used to visually inspect the oil level. The level should be monitored when the engine is running, and is at its operating temperature and should be reading at the upper line. If the engine is cold as is usually the case when checking the level before an event or track day, the level should be within the two lines on the sight glass. The oil level will sit above the sight glass when the engine is not running.

See the Maintenance Schedule for oil and oil filter change intervals.

(We recommend changing the oil every 4 track days. We recommend changing the oil filter every 2-3 oil changes.)

COOLING SYSTEM

WARNING: The X1 must run with SYNTHETIC WATERLESS COOLANT. Failure to do so will cause the engine to overheat, prematurely wear its internal components, or cause catastrophic engine failure.

The correct operating temperature of the Suzuki Hayabusa with the X1's cooling system is between 65 and 110 degrees. Plain water must not be used under any circumstances

Liquid Intelligence is the brand of **synthetic waterless coolant** recommended by Hyper Racer. If this product is not available in your area, an equivalent will need to be found.

The coolant quantity from empty is aprox 4.8L

BLEEDING THE COOLANT SYSTEM

When filling the X1, it is critical to bleed the cooling system. Failure to complete this process correctly will trap air in the system, causing the engine to overheat and prematurely wear its internal components.

BLEED SCREW LOCATIONS

Locate the Filler Neck behind the engine on the right-hand side.

Locate the bleed screws at the top of each of the two radiators.

Locate the bleed screw at the back of the thermostat housing, on the back of the cylinder head.

Locate the crossover radiator hose that sits in front of the engine, this is fitted with a bleed fitting on the left-hand side just behind the fuel filler neck.

Filling is recommended to be completed with 2 people, where one person can fill and the other can remove and install bleed screws around the car.

WARNING: If you have a Gen 2 cooling system you must bleed the RIGHT radiator BEFORE the LEFT radiator to avoid airlocks (Drivers Perspective). Running the Engine with an airlock can lead to catastrophic failure.

Step 1: Unwind the RIGHT radiator bleed screw two or more full turns, and pour coolant into the filler neck until it comes out of the right radiator bleed screw hole, the bleed screw can be tightened once coolant exits the radiator bleed port.

Step 2: Unwind the LEFT radiator bleed screw two or more full turns, and continue to pour coolant into the filler neck until it comes out of the left radiator bleed screw hole, the bleed screw can be tightened once coolant exits the radiator bleed port.

Step 3: Loosen the bleed nut on the crossover tube and continue to fill the cooling system from the filler neck. Coolant will start to exit the system from this bleed screw, you should see bubbles exit simultaneously during this process. Continue to fill the coolant system from the filler neck until no bubbles can be seen exiting the system and reinstall the bleed screw.

Step 4: With a drip tray under the car, unscrew the thermostat housing bleed screw two full turn turns and continue to fill the cooling system from the filler neck. Coolant will start to exit the system from this bleed screw, you should see bubbles exit simultaneously during this process. Continue to fill the coolant system from the filler neck until no bubbles can be seen exiting the system and reinstall the bleed screw. This process can take a significant amount of time.

Step 5: Once complete tighten all 4 bleed screws as directed. The screw on the engine has a copper washer and can be tightened securely. The screws in the radiators have nylon washers and should be firmly but not excessively tightened to prevent damaging the washer. The fitting on the crossover hose has a taper seal and only needs to be lightly tightened.

Step 6: Ensure there is some coolant in the overflow canister (approx 1/3) for the system to draw from.

Step 7: Once these steps have been completed, the engine can be started and run until the operating temperature is reached. This will open the thermostat and allow the coolant system to flow properly. A good indication that the system has been bled correctly, is both left and right radiators are warm to the touch. You may need to top up the system once more after the engine has cooled.

NOTE: The cooling system will flow slowly at idle, Increasing the engines RPM will assist with this process.

Step 8: After filling the coolant system, monitor the engine's coolant temperature from the Aim dashboard during the vehicle's first shake-down session. If inconsistent coolant temperatures are displayed, slow down immediately and drive the vehicle back to the pit area/garage. Inconsistent or fluctuating coolant temperatures are an indication of air being trapped in the system, and the coolant bleeding procedure will need to be performed again to remove it.

REKLUSE CENTRIFUGAL CLUTCH SYSTEM

Vehicles can be optioned to include a Rekluse Centrifugal Clutch system. This section will outline the details and adjustment procedure imperative to running a vehicle with a Rekluse Clutch.

If your car has a standard manual clutch this section is not relevant.

A Rekluse centrifugal clutch can be fitted to an X1's Hayabusa Engine to prevent damage to the starter motor when the vehicle rolls backward as a result of a spin. If the rear wheels roll backward when directly connected to the engine's factory transmission system, this will cause the starter motor to engage via a one-way bearing and cause catastrophic failure of the starter motor. The Rekluse Clutch system will disengage with the engine's RPM falls to 0, preventing this failure from occurring.

SLIP ADJUSTMENT

The bite point or slip adjustment of the Rekluse system must be set correctly for the system to operate, it must also be checked before each track day. If the slip adjustment is set too tight, the engine will stall when it is put into gear, if the slip adjustment is set too loose, this will cause the clutch system to slip when under higher engine load, and wear prematurely, and in some extreme cases cause the system to become inoperable.

The slip adjustment is adjusted with the 4mm hex Allen key located in the clutch slave cylinder.

Clockwise will push the clutch plates apart and raise the slip adjustment.

Counterclockwise will bring the clutch plates together and lower the slip adjustment.

ADJUSTMENT PROCESS

Start the engine in neutral.

Kneel on the left side of the car.

Pull the hand clutch with your left hand and select first gear with the other.

When slowly releasing the clutch, you may find that the car does not move, or you may find that the car wants to roll forward. If the car tries to roll forwards, turn the adjustment screw located on the clutch slave cylinder clockwise until you can release the clutch and the car does not move.

The last critical step is to then turn the adjustment counter-clockwise until you hear the engine RPM drop and the car begins to very slowly roll forwards.

The best practice is to have your hand on the clutch so if the car begins to roll, you will be able to engage the hand clutch and prevent this from happening. Alternatively, you can have a 2nd person in the driver's seat to press the brake pedal and/or hand clutch if necessary.

WARNING: Failure to set this position correctly can result in excessive clutch drag or slip during track use and can cause the Rekluse clutch system to fail.

If the slip adjustment is too low, the engine will load up excessively and potentially stall or cause excessive heat during idle and prematurely wear the clutch system. You will need to screw the adjuster clockwise until the engine load is minimal.
If the slip adjustment is too high, the engine will not load up at all and the car will not move. Track use when the slip adjustment is too high will cause the clutch to slip under high load and can cause the Rekluse clutch system to fail.

It is very important to check this adjustment before a race meeting or track day. Simply check the engine load by releasing the clutch while the car is running and 1st gear has been selected. Best practice is to check this adjustment at the beginning of every session, as outlined below.

Clutch 'track test':
Start the engine.
Kneel on the left side of the car and engage the hand clutch
Select first gear.
Listen to the engine load as you release the hand clutch.
If the engine loads slightly and the car tries to roll forward, the adjustment is good.
If there is no load on the engine - Adjust the set screw counterclockwise until you feel some load on the engine.
If there is too much load on the engine - Adjust the set screw clockwise.

SWITCHES

IGNITION SWITCH

The ignition switch is located on the switch panel on the left-hand side of the cockpit under the large red flip cover. See diagram for on and off positions.

This ignition switch cuts all electrical power and kills the engine. It will also turn off the fuel pumps.

RAIN LIGHT

The small switch on the switch panel on the left side of the cockpit controls the rain light.
The up position will turn on the rain light, while the down position will turn it off.

When the ignition is switched off the rain light will also turn off.

BATTERY ISOLATOR SWITCH

Under the main roll hoop, attached to the top of the air box, is the battery isolator switch. Turning this off will kill the engine and the electrical system, including the fuel pumps.

It is intended for use by track marshals in an emergency.

You are **not** required to turn this off between sessions or when the car is in storage, the cockpit ignition switch cuts all electrical power, and there is no idle power draw.

BATTERY CHARGING AND JUMP STARTING

BATTERY CHARGING

To charge the battery on the X1, Insert a 12v charger into the 50 amp Anderson connector that is mounted on the bracket holding the battery isolator switch, under the main roll hoop.

JUMP STARTING

The Anderson connector used for battery charging can also be used for jump-starting. Plug in a 12v Jumper Battery and start the engine with the normal starting procedure.

Some cars may be fitted with an internal jump start system for situations during a race or track day where the vehicle requires additional power to restart the engine.

NOTE: The jumper pack must be charged manually with a USB-C cable. The battery level should be inspected prior to a race meeting or track day.

A jump start button is located on the right hand mirror mount, and can be held down simultaneously with the engine start button to restart the engine.

WARNING: Most battery packs are not water proof, this must be removed when washing the car as this can cause a fire.

Aim Solo 2 DL

For information relating to the configuration and use of an AIM Solo 2 DL Dash, click here or scan the QR code below to open the Aim Solo 2 DL Documentation page. Alternativley you can visit aim-sportline.com

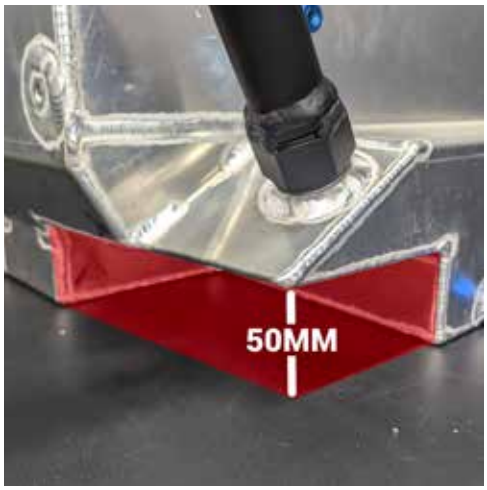
FUEL SYSTEM

The X1 uses a stock Hayabusa engine that runs on 98-octane pump fuel and has a capacity of 20L.

The X1 uses 2 fuel pumps, one low-pressure lift pump mounted within the chassis under the left-hand seat shell, and the standard Suzuki high-pressure pump inside the bottom left of the fuel tank. Access can be found via the bottom of the fuel tank once the skid plate has been removed.

The fuel tank has an internal 800ml header tank that is fed by the lift pump, ensuring that the high-pressure pump always has a good fuel supply. This system will allow the X1 to run right down to minimal fuel capacity. If you run out of fuel you will get very little warning.

The fuel level is checked visually down the filler neck. When looking down the neck you will see an aluminium base, this is not the bottom of the tank, it is the pump mounting base that sits 50mm higher than the bottom of the tank. A common mistake is to think the tank is empty when it may have up to 8L of fuel in the tank.



The fuel cap has an O-ring seal that will bite when it is dry, making the cap difficult to remove. This O-ring is often unintentionally lubricated with fuel from filling the tank, once this fuel evaporates it will make the cap difficult to remove. It is recommended to lubricate this O-Ring every few track days with some Silicone Grease or Rubber Grease.

All Hyper Racer X1 Vehicles are equipped from the factory with a fuel breather hose that has a one-way ball valve fitted up in the main roll hoop to comply with FIA regulations.

SEAT REMOVAL/INSTALLATION

REMOVAL PROCESS

The seat in the X1 consists of 2 carbon/Kevlar halves. One has to be removed before the other. There is a joining strip that runs down the middle of the two halves and is connected with M5 BHCS (button-head) screws. Additionally, each half consists of 5x FSCS (countersunk) M6 screws that bolt the seat halves into the chassis.

When removing the seat, you will first need to remove all of the M6 chassis screws around the perimeter of the seat, to relieve any tension, then you can remove the left M5 BHCS screws before removing the left seat shell. You cannot remove the RIGHT seat shell before removing the LEFT seat shell.

WARNING: The left portion of the joining strip has integrated nut plates to allow for the M5 BHCS screws to be removed and installed without needing to access the back of the seat halves. The right-hand side of the joining strip is bolted directly to the right-hand seat half with Nyloc nuts, and should not be removed. The joining strip will remain bolted to the right-hand seat half.

You will need to remove the steering wheel to provide adequate space for the seat extraction. You may find that the seat belt buckles can be difficult to pull through the hole in the seat when removing or installing the seat half. Angle the buckle to gain more clearance when performing this task.

NOTE: The removal of the left-hand seat half also gives access to the fuel pump as illustrated below.

If you need to remove the right shell, you will need to disconnect the gear cable from its mounting bracket, disconnect the gear cable from the gear lever clevis, and disconnect the gear lever from the chassis.

INSTALLATION PROCESS

WARNING: When fitting the seat halves in the cockpit, make sure you have the seat belts correctly pulled through the holes (and the gear cable) before fully screwing in the seat! If you miss one of these items, you must fully unbolt the two seat halves to create enough space to reinsert the seat belt item or gear cable.

When re-installing the seat, the centre M5 BHCS screws need to be carefully installed to not cause any damage. The best way to do this is to get both seat shells in position within the chassis and start with the centre M5 BHCS screws. Once the centre screws have been installed, you can now install the M6 FSCS screws that secure the seat halves to the chassis. Pulling the shells apart with the chassis mounting screws first will misalign the centre holes and make it difficult to install the M5 centre screws.

CHAIN ADJUSTMENT

For a video tutorial of the X1 chain adjustment process, click here.

First, loosen the idler sprocket bolt 1/4 turn, with the supplied extended 18mm ratchet spanner.

Use the chain 18mm extended ratchet spanner to turn the vertical adjuster bolt to tighten or loosen the chain. As the vertical adjuster bolt has both an 18mm outer hex bolt, and a 3/8" Allen key socket, you may instead use the extended 3/8" ball-end socket that is supplied with the car instead of the 18mm extended ratchet spanner. The ball-end Allen socket allows for angled access from the top of the car with a socket extension.

Chain slack should be between **5mm and 30mm** and can be inspected by eye due to the large tolerance.

Once correctly adjusted, tighten the idler sprocket bolt. Be sure not to over-tighten the bolt as it is not required. The restricted space will make it difficult to remove later if over-tightened.

WARNING: The chain tension does not increase with a change in suspension load, no allowance needs to be made for movement.

CHAIN MAINTENANCE

A motorcycle engine-powered car will load the chain more than it was originally intended. Good care and maintenance is required to ensure the chain lasts as long as possible. Regular lubrication will allow the chain to last a very long time. A dry chain running at these speeds and loads will fail prematurely.

We recommend applying chain lubrication after every session (ie. Every 20 minutes of running) and use good-quality brand-name lubrication. An unsuitable lubrication will appear dry and shiny after a single session. The chain should have some amount of oil still visible after the session.

With the car in neutral and the rear wheels lifted off the ground, you can spin one of the rear wheels while spraying the lubrication nozzle at the chain.

WARNING: The chain should be inspected after every session for blue links. A blue link indicates extreme heat and that chain failure is imminent. The likely cause of this is rough down shifting (poor rev matching) which causes extreme spike loads on the chain.

CHAIN REPLACEMENT

Due to the high chain load, only use high quality chains such as the D.I.D. 530ZVM-X2.

The length of the chain will need to be shortened to suit the X1. This can be done with a chain tool such as the Motion Pro PBR Chain Tool (08-0470). By following the manufacturers instructions, use the tool to break, re-link and connect the chain so that it measures 1m from link to link.

STEERING RACK MAINTENANCE

RE-GREASING THE STEERING RACK

As the rack does not have any weather sealing, it is recommended every 3 months to re-grease the rack to prevent excessive wear.

Turn the steering wheel in any direction until the rack stop is reached, and apply Molygrease to the exposed shaft.

Turn the steering wheel in the opposite direction until the opposite rack stop is reached. Apply Molygrease to the other side of the shaft and turn the wheel in the opposite direction to pull the grease into the bearing surface.

RACK MESHING/ADJUSTMENT

The steering rack will develop play over time as the bushings wear.

Raise the front end of the car with the air jacks or a trolley jack, as you may not feel tight spots with the tyres on the ground.

Loosen the two M6 Grubscrews in the middle of the rack.

Turn the front mesh adjuster in either direction until it begins to tighten.

Lightly tighten one of the M6 Grub Screws and test the mesh by turning the steering wheel left and right. The goal is to find a balance between a notchy steering feel and rotational play in the steering rack.

Rotate the rack clevis as shown, in different steering positions to test for rotational play.

IMPORTANT: It is OK to feel a small amount of stiffness or notching in the steering when trying to mitigate the rotational play in the rack, this will not be felt when the car is on the ground.

You may need to repeat this a few times by loosening the grub screws, turning the hex head tighter or looser depending on the feel, then lightly tightening one of the grub screws before re-testing at the wheel. Once the rack is adjusted correctly, both screws can be tightened down with Blue 243 or medium-strength Loctite.

SUSPENSION ADJUSTMENTS

The X1 has several suspension adjustment points to align the vehicle. This section will outline the adjustments available on the X1 for customizing the setup to the drivers own preference.

The subsequent 'Factory Car Setup' Section which can be found by clicking here, will illustrate how to achieve a factory car setup which has been developed over 2 years of initial testing, and 2 years of national championship level racing.

SWAY BAR ADJUSTMENTS

Unlock the sway bar pins by loosening the 1/2” Locking Nut.

Use a 6mm Allen Key to Adjust the Sway Bar Stiffness. Clockwise will move the Rubber contact inward, making the roll softer. Anti-Clockwise will move hte rubber outward, making the roll stiffer.

PUSH ROD ADJUSTMENT

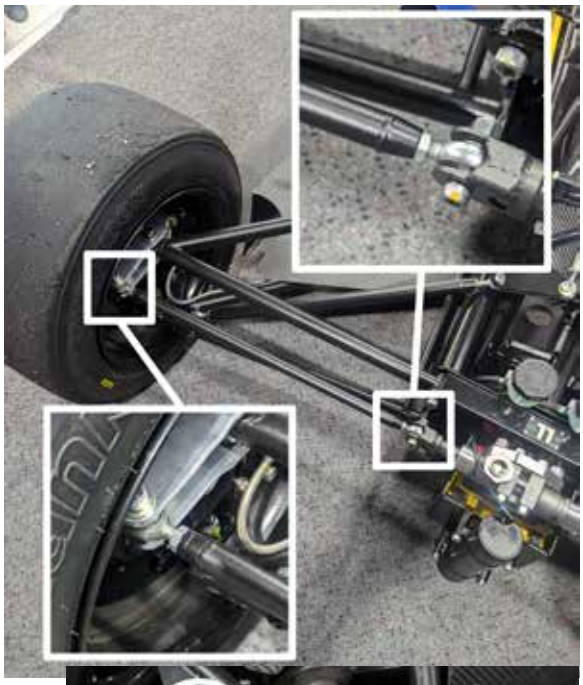
Initially you will need to set the ride height using the 4 push-rods located at each corner of the vehicle. The push rods will also be used to corner weight the car at the end of the alignment process.

Loosen both half nuts located at each end of the push rod. Each push rod has a left-hand and right-hand thread at each end, allowing you to turn the rod to increase or decease the total length.

STEERING ROD ADJUSTMENT

The Steering Rod can be lengthened and shorted on each side to align the steering wheel and set an amount of toe in or out. Simply loosen the half nuts, and turn the rod until you reach the desired amount of toe in/out. Finally, tighten the half nuts to secure the rod length.

For video instructions on adjusting the steering arm, click here.



REAR TRACK ROD ADJUSTMENT

Similarly to the steering rod, the rear track rod can also be lengthened and shortened but only dictates the amount or rear toe in or out.

CAMBER ADJUSTMENT

For video instructions on camber adjustments, click here.

Camber shims can be added and removed to set the camber at each wheel.

Loosen the two bolts holding the camber arm onto the upright and install the desired number of camber shims.

NOTE: Complete cars come aligned from the factory and will likely have uneven numbers of shims, this is normal. If the shims need to be removed, ensure that they are reinstalled into the same corner of the car that they were removed from.

ADJUSTING REAR CASTER

The rear upper control arm has two rod ends where it mounts to the chassis, this allows for adjustment of the position of the top arm. The bottom position of the upright is fixed in position. Caster adjustments are made by using the upper control arm to move the upper portion of the upright forwards or backwards.

ADJUSTING FRONT CASTER

Front castor can be adjusted using the rear rod ends of both the upper and lower control arms.

Caster is adjusted by either moving the bottom portion of the upright forward or backward using the rod end at the rear of the front lower control arm.

Or, by moving the upper portion of the upright backward or forward using the rod end at the back of the upper control arm.

NOTE: Adjusting these rod ends to set caster will also alter the camber adjustment, this will either need to be taken into consideration when making caster adjustments so that camber is not changed, or you can adjust the camber shims to adjust this independently.

FACTORY CAR SETUP

TOE

Install the toe alignment pins into the top stud of the front and rear wheels. Each pin will have an 'F' or 'R' stamped into the end.

Ensure that the steering wheel is fixed in position so that it does not move when adjusting the toe.

Hold the laser alignment tool up against the wheel you wish to set the toe, and adjust it using the appropriate adjustment rod until the laser aligns with the groove on the opposite alignment pin.

Alignment with the grooves on the toe adjustment pins will achieve 0.5 degrees of toe in for both front and rear wheels.

CAMBER

Starting with either the front or rear axle, place a straight edge and a speed square across both of the tyres as shown.

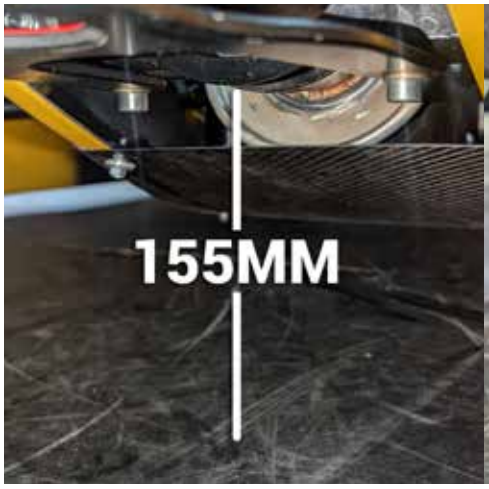
Make sure that the speed square is sitting flat against the straight edge, and that the speed square is just touching the outside of the tyre.

A measurement of 17mm will equate to 2.5 degrees of negative camber which is the factory setting. For your own reference, 21mm will equate to 3 degrees and 14mm is 2 degrees.

RIDE HEIGHT

The front ride height should measure 125mm between the ground and the bottom of the front bulkhead.

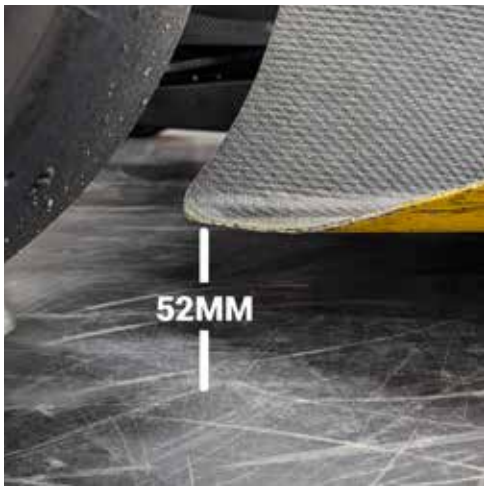
The rear ride height should measure 155mm between the ground and the lowest point of the rear bulk head.



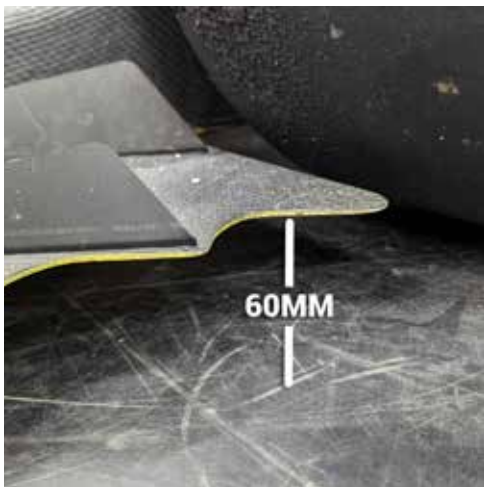
TUNNEL HEIGHT

The tunnel heights can be adjusted by lengthening or shortening the two tunnel brace rods.

Set the front tunnel height by measuring 52mm between the ground and the underside of the tunnel as shown.



Set the rear tunnel height by measuring and 60mm between the ground and the underside of the tunnel as shown.



CASTOR

As the rear lower control arm is not adjustable, assuming it is not damaged, this can be used as a datum point for both sides of the car to take measurements from. The factory **4.5 degrees of positive castor at the front**, and **2 degrees of negative rear castor**, can be set by adjusting the front and rear arms as mentioned in the previous castor adjustment section until the measurements below have been reached.

Front lower face of the rear upright (level with the bolt head) to the rear of the front lower ball joint carrier.

2395mm

Front lower face of the rear upright (level with the bolt head) to the rear of the bolt head connecting the upper control arm to the camber/steering arm.

2410mm

Rear of the front ball joint carrier to the front of the bolt head connecting the rear upper control arm to the camber arm.

2340mm

Use a digital angle gauge to ensure that the castor on both sides are equal. It is OK to deviate from these measurements in order to make the castor even on both sides.

THROTTLE CABLE ADJUSTMENT

Throttle cables tend to stretch, corrode, and potentially tighten up. The throttle must be adjusted correctly to prevent damage to the throttle cable or throttle bodies. The pedal needs to be contacting its end-stop simultaneously with the throttle bodies hitting its end-stop. To achieve this, you can adjust the throttle body Ferrel until this occurs, if you don't have enough adjustment room in this ferrule, you will need to adjust the throttle cable clamp so that the throttle cable is tight enough before unwinding the throttle body Ferrel adjuster.

There is also a pedal end stops to help adjust pedal-free play and travel.

Check the throttle action regularly, and make sure the pedal springs back very well.

WARNING: Failure to regularly check the throttle cable may cause it to stick which can lead to serious injury or death.

The throttle cable is nylon-lined and should not be lubricated as It is designed to run dry. While the throttle cable should be replaced yearly, more frequent wet weather track days can cause the cable to corrode prematurely and may need more frequent replacement.

AIR JACKS

Cars can be eqipped with the Hyper Racer Air Jack system. There are 2 main ways to fill the system:
- C02 Cylinders
- 18V portable Compressor

Regarless of which option you prefer, the minimum pressure to lift the car is **140PSI**, and the systems maximum pressure is **160PSI**.

The fill point is above the rain light at the rear of the car which uses a NITTO style fitting, compressors will need to use an adaptor for this, the CO2 cylinder can have a NITTO fitting installed onto the cylinder with a pressure releif valve that prevents over filling of the system.

Click here to watch a demonstation video.

BRAKING SYSTEM

The entire braking system on a race car should be closely inspected very regularly.

WARNING: ONLY USE DOT 4 BRAKE FLUID. ALTERNATE BRAKE FLUID TYPES CAN CAUSE THE SYSTEM TO FAIL LEADING TO SERIOUS INJURY OR DEATH.

BRAKING COMPONENTRY TO INSPECT:

Brake pedal feel - The pedal should feel smooth to press and should not stick. The brake pedal should feel firm to depress. The brake pedal should not feel long or spongy.

Brake connecting rod/linkage - The Brake connecting rod should be straight, with all of the bolts and nyloc nuts in good condition. Do not reuse nyloc nuts when assembling this system.

Brake fluid - the brake fluid level can be inspected on the two reservoirs at the front bulkhead of the chassis.

Brake Pads - Check the condition and life of the brake pad, the pads can be used right down until their last 1mm of material, but should not continue to be used after reaching this level.

Brake Calliper Bolts - Check if the calliper bolts are all in the correct places and are adequately tightened to 35Nm, and have red 263 Loctite applied to their threads.

Brake Lines - Check the condition of the brake lines and ensure that they are secured in their mounting locations at the suspension arms and chassis rails. Ensure that they are not able to move into the path of any moving components such as CV shafts.

Brake Discs and Bolts - Check if the discs are in good condition, the bolts should be tightened to 9Nm. The X1 uses a floating disc brake, it is normal to see a small amount of movement in the disc.

CV SHAFT REPLACEMENT

For a video detailing the removal and installation of a CV Shaft in an X1, click here.

CV SHAFT NUT TIGHTENING

The nut on the end of the CV shaft in the centre of the rear wheel needs to be tightened adequately. If you have removed or changed the shaft you will need to tighten this with a 1/2” drive impact gun.

WARNING: You must use Red Loctite 263 (High Strength). The nut will loosen if this is not completed correctly.

Check this nut several times when on track after removing/replacing the CV shaft. If you ever feel movement in the rear wheel bearing, it will often be that this nut has worked loose. If re-torquing the CV shaft nut does not mitigate the movement in the rear wheel, inspect the suspension componentry, rod ends, and wheel bearings.

GEAR CABLE ADJUSTMENT AND MAINTENANCE

The X1 uses a push/pull cable with M6 rod ends at each end. The position of the lever can be adjusted by loosening the larger 15/16" nuts, and re-tightening them so that the cable moves in the desired direction.

To adjust the lever position in the cockpit, loosen the front nut and tighten the rear nut by the same amount until they are tight against each other, this will move the cable backwards and the lever position forwards. The opposite adjustment can be made to move the lever backwards.

If you have run out of adjustment in the cockpit, the same adjustment can be performed at the other end of push/pull cable in the engine compartment.

The ratio can be adjusted with the 2 positions on the gear lever. The top hole will give a lighter shift with a longer throw. The bottom hole will give a heavier shift with a shorter throw.

We recommend that you start with the top hole.

The gear cable does not require any maintenance, however, excessive force at the shift lever can cause the cable to snap. It is recommended to carry a spare and replace this cable once per year.

CHANGING GEARS

Up-shifting: An up-shift is completed by pulling back on the gear lever. While the accelerator pedal is fully depressed, there will be too much load on the gearbox to complete an up-shift. To shift up a gear you must first de-load the gearbox by lifting off a small amount of throttle. A common mistake is to lift too much and load the gearbox in the reverse direction. The correct amount needs to be practiced but is approximately a 20% lift.

Down-Shifting: On the contrary, the gearbox will be loaded in the other direction under braking. To complete a downshift, this load will need to be relieved by blipping the throttle under braking. This must be practiced and can take some time to perfect. You will know if you have blipped the throttle too much as the car will lurch forward. Conversely, blipping too little will prevent the shift from occurring.

WARNING: Do not exceed 10,500 RPM when downshifting as this will cause catastrophic engine failure. Aim to not exceed a maximum RPM value on the AIM dash of 10,200 RPM when downshifting.

JACKING POINTS

WARNING: Do not attempt to jack the car from underneath the front wing main-plane. This will damage the carbon fiber of the main plane.

Rear Jack Point: To jack the rear of the car, place the jack underneath the lower control arm, as close to the centre as possible. Jacking of the rear is recommended for tasks such as inserting a castor trolley or lubricating the chain.

Front Jack Point: Remove the front wing via the 4 bolts that hold the nose box to the chassis. This will allow you to slide a trolley jack underneath the lower control arm. Similar to the rear, it is recommended to do this from a point as close to the centre of the car as possible.

Castor Trolley Use: When setting the car on a trolley or blocks, the car needs to be supported under the skid rails in the centre area of the car. The Venturi Tunnels are a non-structural part of the car and must not be loaded. The chassis skid rails are outlined in the image below and are designed to take the entire weight of the car when placed on a castor trolley.

**When placing the Castor Trolley under the car, you may also use the exhaust headers to distribute the load of the vehicle. With the front of the trolley on the skid rails and the back of the trolley on the exhaust headers, the car will be well balanced on the Castor Trolley.*

**If you are using the supplied Hyper Racer Castor Trolley, align the handle roughly 100mm in front of the leading Tunnel VG fin to ensure you have positioned the Trolley correctly.*

FIRE EXTINGUISHING SYSTEM

For a video explanation on the X1's fire extinguishing system, click here.

The X1 will be equipped with a hand-held 1kg fire bottle and optionally, a fully plumbed fire suppression system. In either case, the fire bottle sits under the front of the seat.

Operation of the hand-held Fire Extinguisher: The bottle sits in a carrier in the foot well under your legs and can be removed through the cockpit opening. The correct operation depends on the type of Fire Extinguisher installed in the vehicle, please use the instructions located on the fire bottle.

NOTE: The owner must practice the technique of removing the 1kg fire bottle.

Operation of the plumbed fire suppression system:

The Cockpit activation is beneathe the steering column in the middle of the knee panel. This will vary depending on the type of plumbed fire system that is chosen.

There is additional activation on top of the air box under the main roll hoop for marshals to activate the system from outside the car. This will vary depending on the type of plumbed fire system that is chosen.

Please refer to the manufacturer instructions regarding the appropriate nozzle locations and other maintenance advice.

TYRE CHANGING CARE

The wheels on the X1 are a 3-piece design with spun aluminium drums. It is recommended to take your rims to a reputable tyre changing facility that has extensive experience in motor sport. The drums can easily be bent and deformed if the technician is not experienced.

VORTEX GENERATOR FINS

The aluminium Vortex Generator Fins are located on the sides of the front wing end plates, and the sides of the tunnel floors in front of the rear wheels. These aerodynamic elements can be dislodged in the event of an impact. The adhesive used from the factory is Sikaflex 252 High Strength Adhesive Sealant. You can use this or an equivalent to re-glue if necessary.

SUZUKI FAULT CODES

As the X1 uses a stock Suzuki Hayabusa Gen2/3 engine, it is possible to read fault codes by plugging in the standard instrument cluster to help troubleshoot problems.

Remove the head restraint and locate the connector on the right-hand side of the main roll hoop, near the fuse box.

Unplug the connector and insert it into the back of the standard instrument cluster. This will display possible fault codes once the ECU is put into code display mode.

Locate and disconnect the Suzuki K-Line to AIM Dash connector at the back, left hand side of the engine as shown.

Put the Car into code display mode. This can be done with the OEM Suzuki Dealer Mode Switch (09930-82720), or by using a piece of wire the manually bridge the red/white wire with the black/white wire.

When starting the engine with the original instrument cluster and the vehicle in fault code mode, a code should display on the instrument cluster. You can use the list of codes below to help diagnose any issues you may be experiencing.

CODE	MALFUNCTION PART	REMARKS
C00	None	No Defective Part
C11	Camshaft Position Sensor	
C12	Crankshaft Position Sensor	Pick-up Coil Signal, Signal Generator
C13	Intake Air Pressure Sensor	
C14	Throttle Position Sensor	*1
C15	Engine Coolant Temperature Sensor	
C21	Atmospheric Pressure Sensor	
C22	Atmospheric Pressure Sensor	
C23	Tip-Over Sensor	
C24	Ignition Signal 1	For Cylinder #1
C25	Ignition Signal 2	For Cylinder #2
C26	Ignition Signal 3	For Cylinder #3
C27	Ignition Signal 4	For Cylinder #4
C28	Secondary Throttle Valve Actuator	
C29	Secondary Throttle Position Sensor	
C31	Gear Position Sensor	
C32	Primary Injector Signal 1	For Cylinder #1
C33	Primary Injector Signal 2	For Cylinder #2
C34	Primary Injector Signal 3	For Cylinder #3
C35	Primary Injector Signal 4	For Cylinder #4
C36	Secondary Injector Signal 1	For Cylinder #1
C37	Secondary Injector Signal 2	For Cylinder #2
C38	Secondary Injector Signal 3	For Cylinder #3
C39	Secondary Injector Signal 4	For Cylinder #4
C41	Fuel Pump Control System	Fuel Pump, Fuel Pump Relay
C42	Ignition Switch Signal	Anti-Theft
C44	HO2 Sensor	
C46	Exhaust Control Valve Actuator	
C49	PAIR Control Solenoid Valve	
C60	Cooling Fan Control System	Cooling Fan Relay

TOOL LIST

Allen keys - L shaped and a set of T-Bars
1/4 drive socket set
3/8 drive socket set
Metric and Imperial Allen key socket aets - 3/8 drive
Metric and Imperial spanners
Plastic hammer
Heavy hammer for CV shaft changes
Zip ties
Side cutters
Pliers
Screw drivers
Magnetic stick for dropped nuts etc.
19mm deep impact socket for wheel nuts
32mm impact socket for CV nuts
36mm impact socket for front sprocket
150mm 1/2 inch drive impact extension.
Chain adjustment tool - 18mm (Included with all new cars)
Camber Allen Key Tool - 3/8 ball end (Included with all new cars)
Camber Shims (Included with all new cars)
Fuel siphon
Tyre pressure gauge
Chain lube (We recommend Motul road chain lube).
1/2 inch drive rattle gun for wheel nuts.
3/8 inch drive Milwaukee ratchet for general work.
Small 12v charger with 50 Amp Anderson connector.
12v Jump starter pack with a 50 Amp Anderson connector.
LED mini stick work light.
CV shaft removal tool - Available from Hyper Racer.

FLUIDS

Molygrease
WD40
Loctite (263)
Loctite (243)
Anti-Seize (Copper-grease)
10W-60 Castrol Edge Engine Oil
Liquid Intelegence Synthetic Coolant

TORQUE CHART

Metric (Nm)

Thread	Socket Head	Flat Head	Button Head	Shoulder Screw	Low Head	Socket Set Screw
M1.6	0.3				0.08	
M2	0.6				0.15	
M2.5	1.2				0.42	
M3	2	1.4	1.2			0.8
M4	5		3.4	2.8	4	2.2
M5	10	6.8	5.5		8	4.6
M6	16	11	10	7	13	7.8
M8	39	28	24	12	32	18
M10	77	55	47	29	64	36
M12	135	95	82	57	110	60
M14	215	150				62
M16	330	237		100		150
M18	455					
M20	650	480		240		300
M22	870					
M24	1100	640		470		475
M27	1650					
M30	2250					
M36	3850					
M42	6270					

Imperial (Ft/lbs)

Thread	Socket Head UNC (ft-lb)	Socket Head UNF (ft-lb)	Flat Head UNC (ft-lb)	Flat Head UNF (ft-lb)	Button Head UNC (ft-lb)	Button Head UNF (ft-lb)	Shoul-der Screw (ft-lb)	Low Head (ft-lb)	Sock-et Set Screw (ft-lb)
#0		0.22		0.12		0.12			0.08
#1	0.38	0.4	0.21	0.21	0.21	0.21			0.15
#2	0.63	0.67	0.38	0.38	0.38	0.38			0.15
#3	0.92	1	0.58	0.58	0.58	0.58			0.42
#4	1.33	1.5	0.67	0.67	0.67	0.75		0.42	
#5	2	2	1	1.08	1	1		0.79	0.83
#6	2.5	2.83	1.25	1.42	1.33	1.33		0.79	0.83
#8	4.58	4.83	2.5	2.58	2.5	2.5		1.62	1.67
#10	6.58	7.5	3.33	3.75	3.75	3.75		2.79	3
1/4	17	19	8.33	9.17	8.33	9.17	4.17	6.49	7.25
5/16	35	38	16.67	18.33	16.67	18.33	10.42	13	13.75
3/8	62	70	29.17	33.33	29.17	33.33	22.08	24.17	24.17
7/16	100	109	46.67	52.08			39.17	35.67	
1/2	150	172	70.83	83.33	70.83	83.33	39.17	51.25	51.67
9/16	211	239	100	113.33			95.83	51.67	
5/8	283	317	141.67	158.33	141.67	150	95.83	109.58	102.08
3/4	500	562	250	266.67			166.67	200	
7/8	688	767	416.67	450					300
1	1040	1080	666.67						416.67
1 1/4	2080	2310							800
1 1/2	3625	4075							943.33

For more information and technical support, visit hyperracer.com