SLOT CAR TECHNOLOGY

LE BENCH V2

SNR: LBV2C2205

USER MANUAL

EN

PRESENTATION

THE BENCH V2 IS AN INTELLIGENT AND CONNECTED TEST BENCH FOR THE DIAGNOSIS AND BREAK-IN OF 1/32 AND 1/24TH SCALE MODEL CARS.

ITS COMPACT AND ERGONOMIC DESIGN, COMBINED WITH THE MOST ADVANCED TECHNOLOGIES, MAKE IT AN INDISPENSABLE DEVICE TO OPTIMIZE THE PERFORMANCE OF SLOT CAR RACING VEHICLES.

EQUIPPED WITH HIGH PRECISION, IT MEASURES THE ENGINE ROTATION SPEED UP TO 50,000 RPM.

SUMMARY

READ THE **PRECAUTION** SECTION BEFORE USING LE BENCH V2.

THIS IS NOT A TOY. NOT SUITABLE FOR CHILDREN UNDER 14 YEARS.

1. CONTENTS OF THE BOX

The Bench V2 comes with the following:

- 1 Bench V2
- 1 Power adapter 12V 1A
- 1 Pair of motor cords
- 1 Li-Po 3S 800mAh Battery Charger
- 1 Leaflet

2. DESCRIPTION

The Bench V2 is **a test, diagnostic and break-in bench** for miniature cars in 1/32nd and 1/24th scale.

It powers the electric motor of the car being tested and measures the voltage supplied as well as the current and power absorbed. **The Bench V2 also measures the rotational speed of the motor**, without sensor, thanks to a proprietary algorithm offering an accuracy of 0.1% of the measured value over the interval **3,000 to 50,000 RPM (rotations per minute).**

Its housing offers a suitable location on which to place the car in test, ensuring immediate electrical contact with the electrodes of the Bench V2 as well as a stable position of the vehicle. The Bench **V2 housing allows mechanical checks to be carried out** on the vehicle under test, such as the flatness of the chassis and the inter-axis measurement of the front and rear axles.

The Bench V2 uses **a mobile application as a display and user interface,** allowing the user to choose the test or running-in program to be performed, monitor its execution and observe the electrical and mechanical measurements of the engine in real time.

The Bench V2 uses Bluetooth Low Energy Wireless Transmission, Revision 5, to communicate with the mobile app. The Bench V2 mobile app is available for host devices (smartphone or tablet) running **Android and iOS.**

The Bench V2 offers **a user interface consisting of 3 push buttons and 2 LEDs**. It allows you to put it into operation or standby, to choose a test and then to simply control and visualize the status of its execution.

3. INSTALLING THE APPLICATION

Install **the LE BENCH REMOTE** app on a smartphone or tablet **from Google Play for ANDROID devices** or from the **App Store for APPLE devices**.

When running the application for the first time, accept location access and enable Bluetooth to allow connection to Le Bench V2.

4. THE BATTERY

The Bench V2 can be used with a battery (not included) to make it portable.

Compatible batteries must provide a nominal voltage of 11.1V (3S or 3 cells) and have a JST socket with a center distance of 2.5mm.

Before installing the battery, be sure to unplug the 12V adapter socket from the POWER IN port of the Bench V2.

Open the hatch located on the bottom of the Bench V2 by unscrewing the screw provided for this purpose.

Plug the battery's JST jack into the accessible connector in the slot at the indicated polarity. In case of reverse polarity, the Bench V2 and the battery are protected, however the battery will not be operational.

Put the hatch in place on the Bench V2 and then screw in to keep the hatch in position.

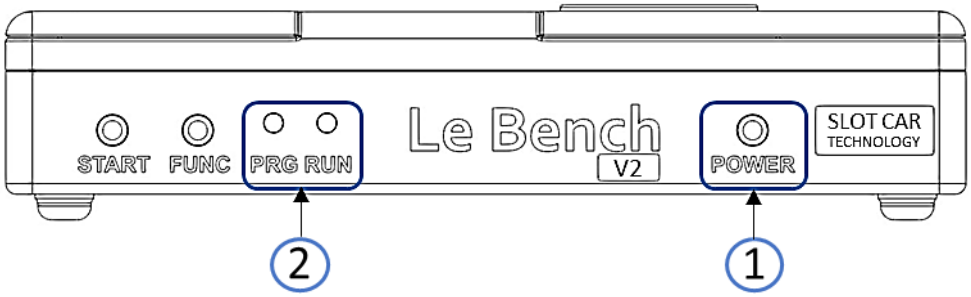
The application indicates in real time the state of charge of the battery. When the battery charge is insufficient, the Bench V2 turns off automatically. It is recommended to charge the battery when the charge is less than 15%.

Battery charging must be achieved by removing the battery from the Bench V2 and using a suitable charger (not supplied) under the responsibility and supervision of the user.

5. POWER-ON

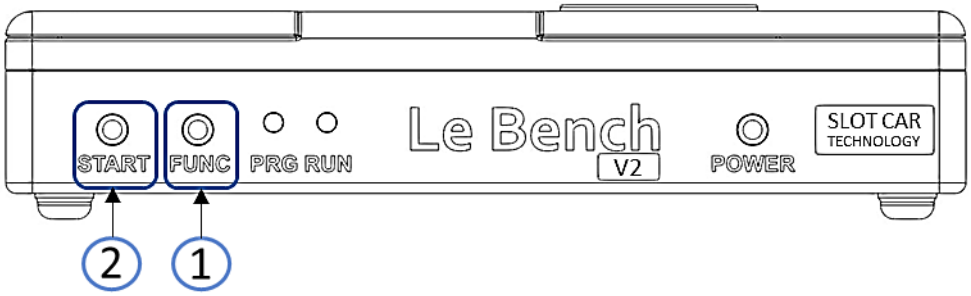
Plug the 12V adapter into an AC outlet and connect its cord to the POWER IN socket of the Bench V2.

Press the POWER button (1) on Bench V2 until the PRG and RUN LEDs (2) flash 3 times.



6. SHUT DOWN

Hold down the FUNC button and press the START button.



The PRG and RUN LEDs flash 3 times and then turn off, indicating the stop of the Bench V2.

7. CONNECTING THE APPLICATION

From the **BENCH REMOTE application**, click on SCAN.

The Bench V2 then appears in the list of detected devices.

Click on **CONNECT** to connect the application to the Bench V2.

Once connected, you have access to the **program menu** as well as the **status of your Bench V2**: battery charge level, engine test voltage and engine status.

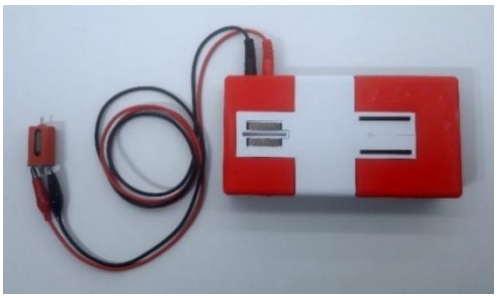
8. IMPLEMENTATION

VEHICLE TESTING

- Remove the right red pad from the Bench V2 to release the rear axle of the vehicle being tested.
- Place the vehicle on the Bench V2 by positioning its guide in the hole provided between the braids.

ENGINE TESTING

- Plug the black banana socket into the MOTOR- hole of the Bench V2.
- Plug the red banana jack into the MOTOR+ hole on the Bench V2.
- Connect the alligator clips of the cords to the electrical connections of the engine under test.



MECHANICAL CONTROLS

- Remove the left and right red pads and replace them such that the millimeter verniers are visible.

9. USE WITH THE APP

The **MENU** screen allows you to choose the Bench test program.

Press the button corresponding to the chosen program:

MANUAL: RPM reading and manual adjustment of the engine setpoint

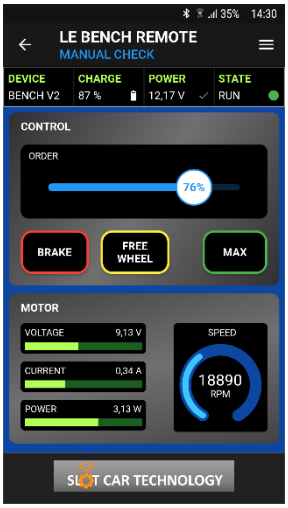
CHECK: Quick check engine, transmission, and lights

RUNIN: Automatic engine or vehicle break-in

MOTOR: Engine performance characterization and comparison

9.1 PROGRAM MANUAL

The **MANUAL** program allows you to adjust the engine setpoint and display its speed in RPM.



In the **CONTROL** section, the slider allows you to adjust the engine setpoint manually. The **BRAKE** button stops the engine with maximum braking, the **FREE RUNNING** button stops the engine coasting. The **MAX** button sets the engine setpoint to 100%.

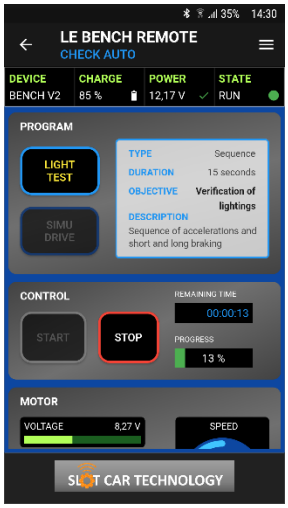
The **MOTOR** section allows you to view the real-time measurement of the electrical parameters of the motor in voltage (in Volt), current (in Ampere) and power (in Watt).

The rotation speed is indicated in real time and in RPM (Rotations Per Minute).

9.2 PROGRAM CHECK

The **CHECK** program offers two test functions for rapid vehicle diagnostics.

LIGHT TEST



The **LIGHT TEST** is used to check the lighting of the vehicle under test: brightness, holding time, behaviour in the event of a runway departure.

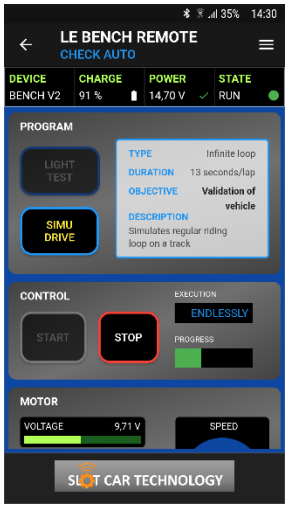
The test lasts 15 seconds and achieves a succession of accelerations and periods of engine shutdown.

To start the test, press the **START** button. The test stops automatically.

To stop the running test, press the **STOP button**.

During the test, the **MOTOR** section displays the electrical and engine RPM measurements in real time.

SIMU DRIVE



The **SIMU DRIVE** test verifies the vehicle's dynamic behavior by simulating driving on the track and performing a succession of laps.

The test consists of the infinite repetition of a 13s sequence reproducing a sequence of acceleration and braking typical of a lap of the track.

To start the test, press the **START button**.

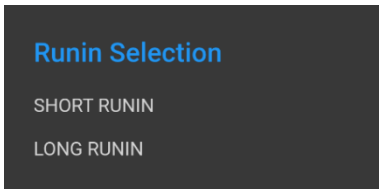
To stop the test, press the **STOP button**.

During the test, the **MOTOR** section displays the electrical and engine RPM measurements in real time.

9.3 PROGRAM RUN-IN

The **RUNIN** program allows you to perform the automated running-in of an engine or vehicle.

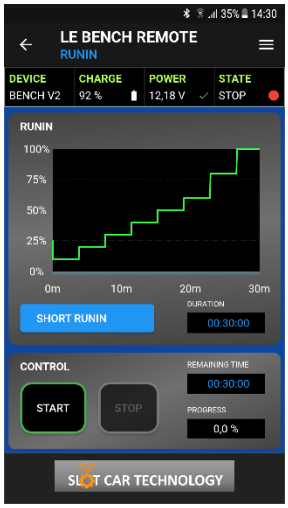
Press the blue **RUNIN** button to choose and load a break-in program, then press the desired break-in.



SHORT RUNIN: Rapid break-in or return to service of an engine

LONG RUNIN: New engine break-in

SHORT RUNIN



The **SHORT RUNIN** exerts the motor from 10% to 100% set in 8 steps over a period of 30 minutes.

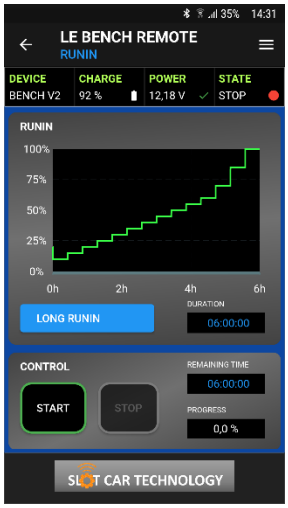
To start running-in, press the **START** button. Running-in stops automatically after 30 minutes.

To interrupt the short break-in, press the **PAUSE** button. To resume running-in, press the **START button**.

To stop running-in, press the **STOP button**.

During running-in, the **ENGINE** section displays real-time electrical and engine RPM measurements.

LONG RUNIN



The **LONG RUNIN** exercises the motor from 10% to 100% set in 14 steps over a period of 6 hours.

To start running-in, press the **START** button. Running-in stops automatically after 6 hours.

To interrupt the short break-in, press the **PAUSE** button. To resume running-in, press the **START button**.

To stop running-in, press the **STOP button**.

During running-in, the **ENGINE** section displays real-time electrical and engine RPM measurements.

9.4 PROGRAM MOTOR

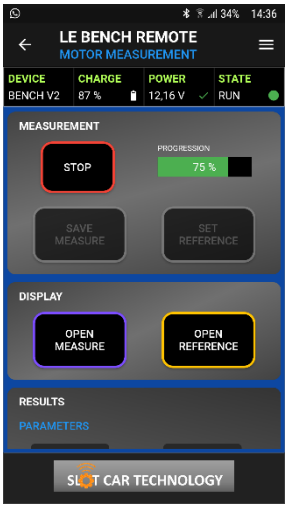
The **ENGINE** program allows you to measure, record and compare the characteristics of an engine.

The measured data are the speed **and** engine power **at rated speed (e.g., 12V) as well as** the speed curve **as a function of the engine speed captured at 20 measuring points, i.e., every 5%.**

The recording and comparison of engine characteristics makes it possible, for example, to **evaluate the ageing of an engine** by measuring it before the race and during the race.

It also makes it possible **to compare several engines** alone, or mounted on vehicles, with each other, to evaluate their performance.

MEASURING AN ENGINE



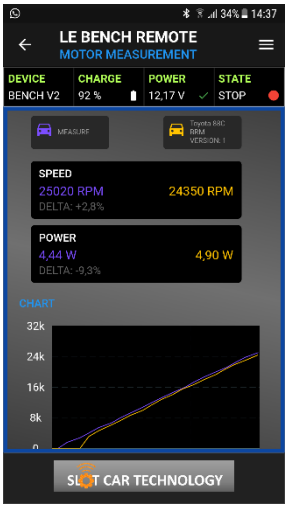
To start measuring a motor, press the **START** button. The measurement stops automatically after exercising the engine in steps of 5% increase in rpm.

To stop a measurement in progress, press the **STOP button**.

The measurement is completed when the progression returns to 0% and the engine under test stops.

The measurements are displayed in **PURPLE** in the **RESULTS section**.

VIEW AND COMPARE ENGINE MEASUREMENTS



The display of recorded measurements and characteristics is available in the **RESULTS section**.

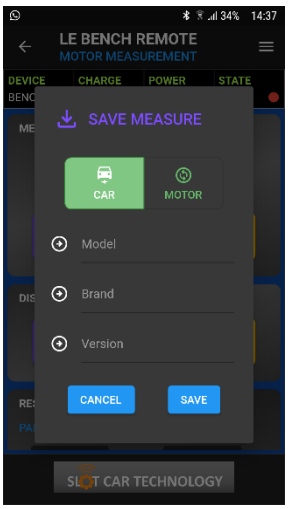
The left section, in **PURPLE**, shows the last bar.

The straight section, in **ORANGE**, shows a reference measurement, previously loaded.

The nominal **SPEED** and **POWER** measurements indicate the measured values as well as the percentage deviation.

Speed **curves** are displayed in overlay to allow **comparison**.

RECORD MEASUREMENTS OF AN ENGINE

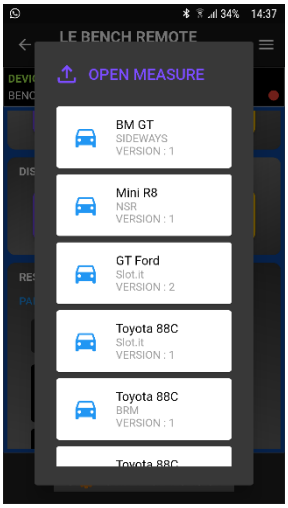


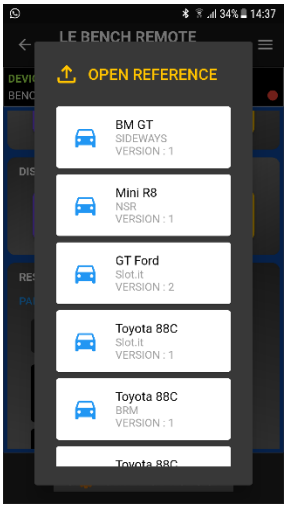
To save the measurement, press the **SAVE MEASUREMENT** button.

Selects the type of measurement: **CAR** or **ENGINE.**

Complete the model, make and version information and press **SAVE** to save the measurement.

OPEN AN EXISTING ENGINE MEASUREMENT





To compare a measurement made with a previously recorded measurement, press the **OPEN REFERENCE** button**,** and choose the measurement.

To compare two previously saved measurements, press OPEN **MEASUREMENT,** choose a measurement, then press OPEN REFERENCE **and then choose another measurement.**

Compare the 2 results in the **RESULTS section**.

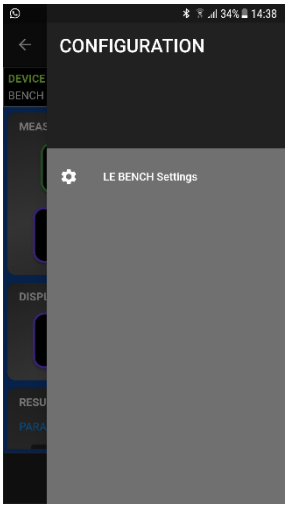
CLEAR AN EXISTING MEASUREMENT

To clear an existing metric, tap **OPEN MEASURE** to view the list of existing metrics.

Press and hold the measure to be erased until it disappears from the list.

9.5 CONFIGURATION

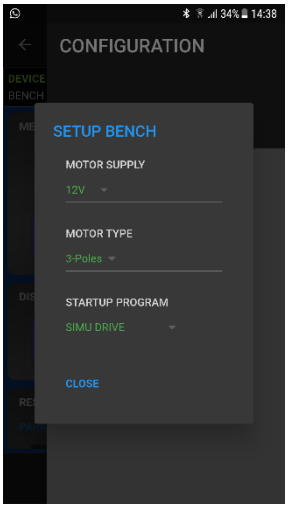
The **CONFIGURATION** menu allows you to adjust the parameters of the Bench V2 connected to the application: test voltage, motor type and program at start-up.



To access the **SETUP** menu, press the three white lines at the top right of the application, or from each screen, swipe from the right side of the screen to the center.

Then tap Settings **THE BENCH** to access the settings.

Settings LE BENCH



Tap the value in **GREEN** and then choose the value from the list.

MOTOR SUPPLY: 12V to 18V in steps of 0.5V
Sets the applied test voltage rating to 100% rpm.

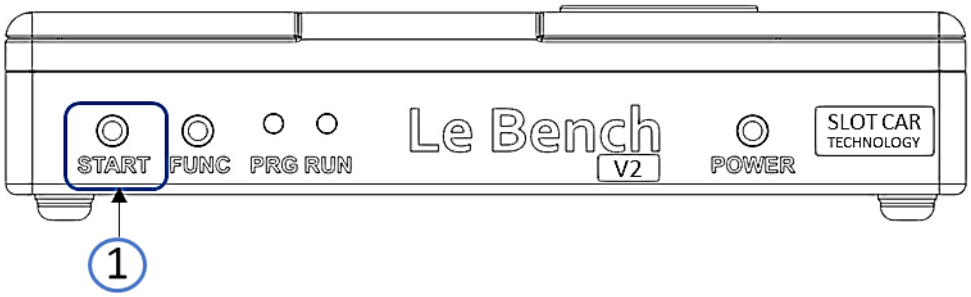
MOTOR TYPE: 3-pole or 5-pole
Sets the engine type for RPM measurement

STARTUP PROGRAM:
Set the default program when starting Bench V2

Press **CLOSE** to return to the previous screen.

10.USE BENCH ONLY

You can use THE BENCH V2 alone, without the application, to perform the most common uses as well as all mechanical measurements and controls.



CHECK THE ENGINE AND LIGHTS

At power on, the BENCH V2 is in CHECK MANUAL program. This program allows you to adjust the engine setpoint from 0 to 100%.

Pressing the START button on the BENCH V2 increases the setpoint by 10% to 10%. Note that the speed variation at each press is done gradually so as not to solicit the mechanics and the engine unnecessarily during the tests.

Once at 100%, pressing START stops the engine by braking to the maximum.

When the engine is stopped, a long press of the START button passes the setpoint to 100% with a gradual variation.

It is thus possible to quickly test the proper functioning of the engine and lighting, and to check the absence of vibrations by varying the engine speed.

HONING A VEHICLE OR ENGINE

You can change the program in which BENCH V2 starts when powered on and choose a ROD program for example.

The selection of the startup program is done from the PREFERENCES menu of the BENCH V2 in the LE BENCH REMOTE application. Note that BENCH V2 memorizes this setting for its next power on.

Once the startup program is selected, such as SHORT ROD, each time the BENCH V2 is powered, the BENCH V2 starts in SHORT ROD.

Pressing the START button then starts the SHORT RODDING. New support pauses the program. Long pressing the STOP button stops the program. At the end of the program, the BENCH V2 stops the vehicle's engine and goes into standby.

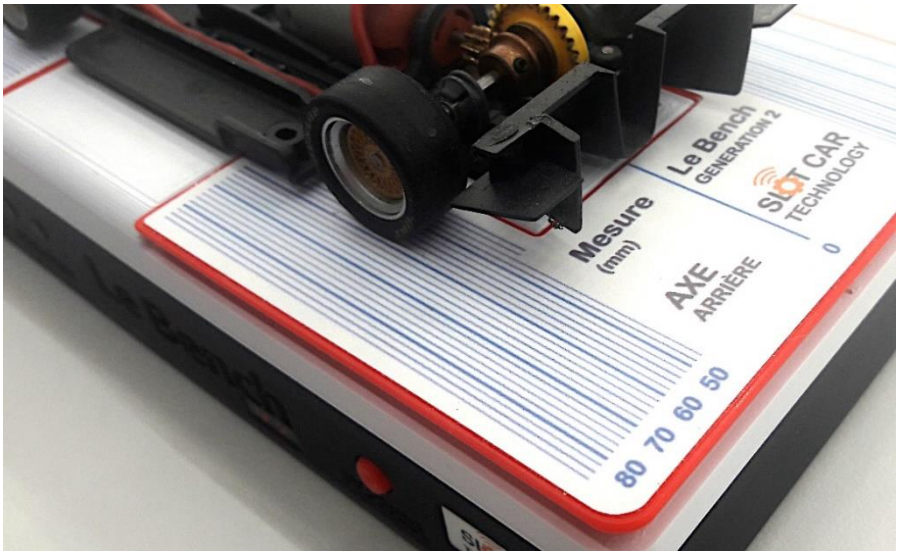
11. MECHANICAL MEASUREMENT

REAR CENTRE DISTANCE MEASUREMENT

The vernier has a graduation every 2mm.

On the vehicle depicted, the tire arrives between graduation 58 and 60.

We therefore measure a rear center distance of 59mm.

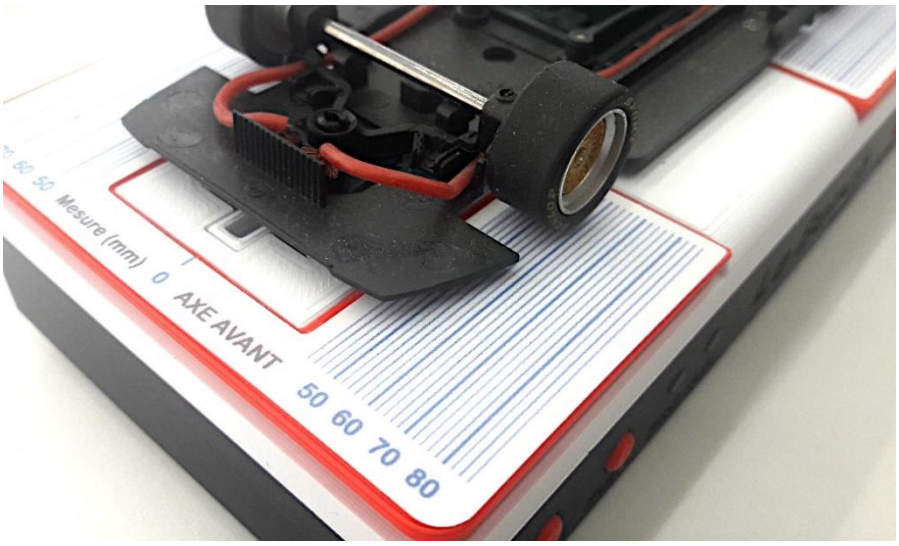


FRONT CENTRE DISTANCE MEASUREMENT

The vernier has a graduation every 2mm.

On the vehicle depicted, the tire arrives on graduation 60.

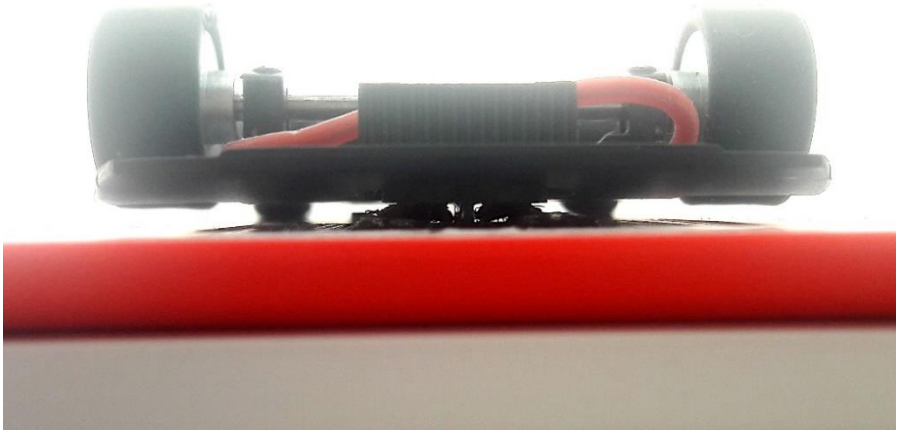
We therefore measure a rear center distance of 60mm.



BRAIDS AND NOSE GEAR CONTROL

On the vehicle depicted, the braids of the vehicle meet the braids of the Bench V2, at the level of the rails on a track.

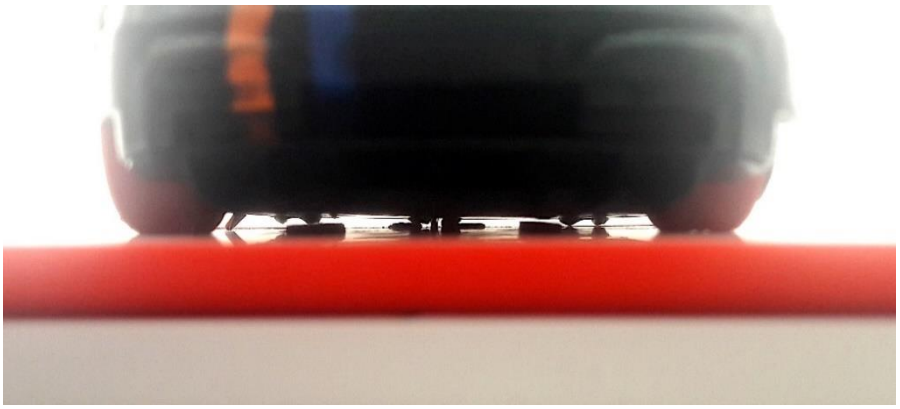
It is observed that the wheels of the front axle do not meet the surface of the Bench V2 which indicates the need to adjust the vertical position of the front axle to obtain a healthy behavior of the vehicle on the track.



CHASSIS FLATNESS CONTROL

On the vehicle depicted, the chassis has good flatness and no visible defects.

The underbody is well parallel with the surface of the Bench V2 which indicates a correct adjustable of the rear axle.



12. PRECAUTION

THIS IS NOT A TOY. NOT SUITABLE FOR CHILDREN UNDER 14 YEARS.

The BENCH V2 should be used in a dry indoor environment.

The BENCH V2 should only be used with the supplied AC adapter, in case of mains power. In the event of a power adapter fault, contact SLOT CAR TECHNOLOGY to order a suitable adapter.

The BENCH V2 must be exclusively connected to a 12V DC spindle motor and all electrical equipment (lighting kit and chips for digital tracks for example) intended for Slot Car vehicles in 1/32nd and 1/24th scales. This applies to the braids on the top of the BENCH V2 case and on the MOTOR output on the back of the BENCH V2.

READ CAREFULLY

Use only a Lithium-Polymer battery with a nominal voltage of 11.1V with a mini JST connector and a maximum size of 60 x 35 x 20 millimeters.

Refer to the **BATTERY COMPATIBILITY** section in the SPECIFICATIONS chapter of this manual for more information.

As an example, we suggest the use of reference batteries GNB4503S80AA (capacity 450mAh) or GNB5503S80AA (capacity 550mAh) from GAONENG.

To recharge the battery, remove the battery from the BENCH V2 and use the charger that came with your Bench V2.

It is recommended to remove the battery from the Bench V2 in case of prolonged non-use (more than 3 months), to avoid deep discharge of the battery and decrease in its lifespan.

This symbol on the product or in the instructions indicates that The Bench V2 must be disposed of separately from household waste. There are separate collection systems for recycling in the EU.

For more information, please contact your municipality or the dealer who sold you the product.

This symbol on the product or in the instructions indicates that The Bench V2 should be used exclusively in an indoor or domestic environment.

Do not use outdoors.

13. SPECIFICATION

The data below is provided for information purposes only.

LE BENCH V2

CONTRÔLE MOTEUR

Tension d'essai réglable	10 à 18V
Pas de réglage de tension d'essai	0,1V
Courant d'essai	3A max
Protection de court-circuit	Oui
Limiteur de couple	Oui

INDICATIONS ELECTRIQUES

Vitesse de rotation	2'500 à 50'000 RPM
Tension	0 à 20V
Courant	0 à 3A
Puissance	0 à 30W

COMMUNICATION

Type	Bluetooth BLE 5.0
Antenne	Intégrée
Portée	5 mètres
Appairage	Automatique et Sécurisé

ALIMENTATION

Tension d'entrée adaptateur secteur	12V
Tension d'entrée batterie	8 à 14V
Consommation en veille (moteur stoppé)	1,2mA
Consommation en standby	25µA
Puissance maximale	25W

COMPATIBILITÉ BATTERIE

Type	Lithium-Polymer
Tension nominale	11,1V
Capacité maximale	800mAh
Connecteur de décharge	Mini JST
Connecteur de charge	JST-XH
Dimensions maximales	60 x 35 x 20 mm

MECANIQUE

Dimensions	180 x 92 x 40 mm
Poids (sans batterie)	310g
Matériau du boitier	PLA HT

ENVIRONNEMENT

Température de fonctionnement	0 à +35°C
Température de stockage	-15 à +45°C

BLOC SECTEUR

Référence / Fabricant	SWI12-12-N-P6 / CUI Inc
Entrée	90VAC à 264VAC, 47 à 63Hz
Connecteur d'entrée	Type Europe
Sortie	12VDC 1A
Connecteur de sortie	Type Power 5,5 / 2,5 mm
Puissance	12W maximal
Protections	Sur courant, sur tension et court-circuit
Dimensions	72 x 34 x 80 mm
Poids	118 g
Température de fonctionnement	0°C à +40°C
Température de stockage	-20°C à +80°C

CHARGEUR DE BATTERIE

Référence / Fabricant	B3 Pro / imax RC
Entrée	100VAC à 240VAC, 50/60Hz
Connecteur d'entrée	Type Europe
Sortie	3x 800mA
Connecteur de sortie	JST-XH
Dimensions	92 x 59 x 36 mm
Poids	100 g
Température de fonctionnement	0°C à +40°C
Température de stockage	-20°C à +60°C

14.INFORMATION

The Bench V2 is a product designed and manufactured in France.

The Bench V2 is identifiable by its serial number (SNR): LBV2C2205.

15.CONTACT

For any support request relating to the LE BENCH V2 product, contact SLOT CAR TECHNOLOGY by email at the following address: support@slotcartechno.com

The BENCH V2 is a **SLOT CAR TECHNOLOGY** product, a registered trademark of RATIOTECH INGENIERIE.

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